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# Index and Bulk Parameters for Frequency-Direction Spectra Measured at CERC Field Research Facility, September 1990 to August 1991

by Charles E. Long, Juliana Atmadja

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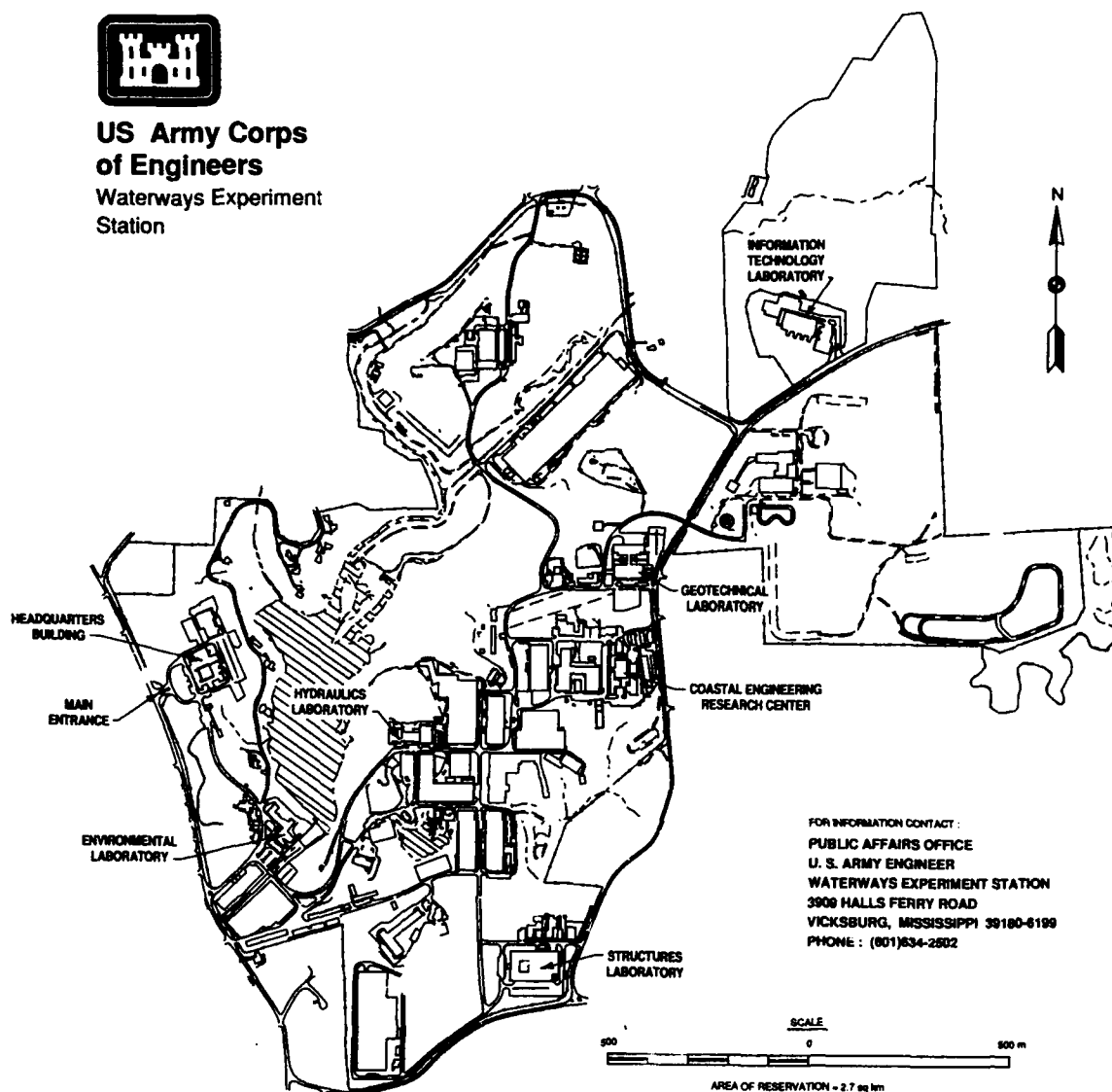
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# Contents

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Preface . . . . .	iv
1—Introduction . . . . .	1
2—Field Research Facility . . . . .	3
Bathymetry . . . . .	3
Wave-Generating Winds . . . . .	3
3—Instrumentation . . . . .	5
4—Data Collection . . . . .	8
5—Data Processing . . . . .	9
Error Checking . . . . .	9
Frequency-Direction Spectra . . . . .	12
Bulk Parameters . . . . .	17
6—Archived Results . . . . .	25
7—Retrieving Processed Data . . . . .	27
8—Summary of Results . . . . .	29
References . . . . .	30
Appendix A: Table of Collection Times and Bulk Parameters . . . . .	A1
Appendix B: Time Series Graphs of Bulk Parameters . . . . .	B1
Appendix C: Listing of FORTRAN Computer Program . . . . .	C1
Appendix D: Listing of Sample Data File . . . . .	D1
Appendix E: Notation . . . . .	E1

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# Preface

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This report indexes and describes means of access to a series of wind-wave frequency-direction spectral observations made with a special, high-resolution directional wave gauge. The work was motivated by a paucity of observations of directionally distributed wave energy, which has hindered understanding and modeling of the nearshore processes that affect coastal engineering projects. This effort was authorized by Headquarters, U.S. Army Corps of Engineers (HQUSACE), under Civil Works Coastal Flooding Program Research Work Unit 32484, "Directionality of Waves in Shallow Water." Funds were provided through the Coastal Engineering Research Center (CERC), U.S. Army Engineer Waterways Experiment Station (USAEWES), under the program management of Ms. Carolyn M. Holmes, CERC. Messrs. John H. Lockhart, Jr., John G. Housley, Barry W. Holliday, and John F. C. Sanda were HQUSACE Technical Monitors.

This summary report was prepared by Dr. Charles E. Long using data processed and archived with help from Ms. Juliana Atmadja, a student contracted through the Cooperative Education Program at Florida Institute of Technology, at CERC's Field Research Facility (FRF), Duck, NC. Work was performed under the direct supervision of Mr. William A. Birkemeier, Chief, FRF, and Mr. Thomas W. Richardson, Chief, Engineering Development Division, CERC; and under the general supervision of Dr. James R. Houston and Mr. Charles C. Calhoun, Jr., Director and Assistant Director, CERC, respectively.

The directional wave gauge and its data processing software were designed by Dr. Joan M. Oltman-Shay while at Oregon State University working through an Intergovernmental Personnel Agreement. This work would not be possible without continued physical maintenance of the directional wave gauge. This was done by the FRF dive team consisting of Messrs. Birkemeier, Michael W. Leffler, H. Carl Miller, Eugene W. Bichner, and Brian L. Scarborough. Gauge calibration was maintained by Mr. Kent K. Hathaway, FRF. Acquisition, monitoring, and storage of raw data were done by Mr. Clifford F. Baron, FRF.

At the time of publication of this report, Director of WES was Dr. Robert W. Whalin. Commander was COL Bruce K. Howard, EN.

# 1 Introduction

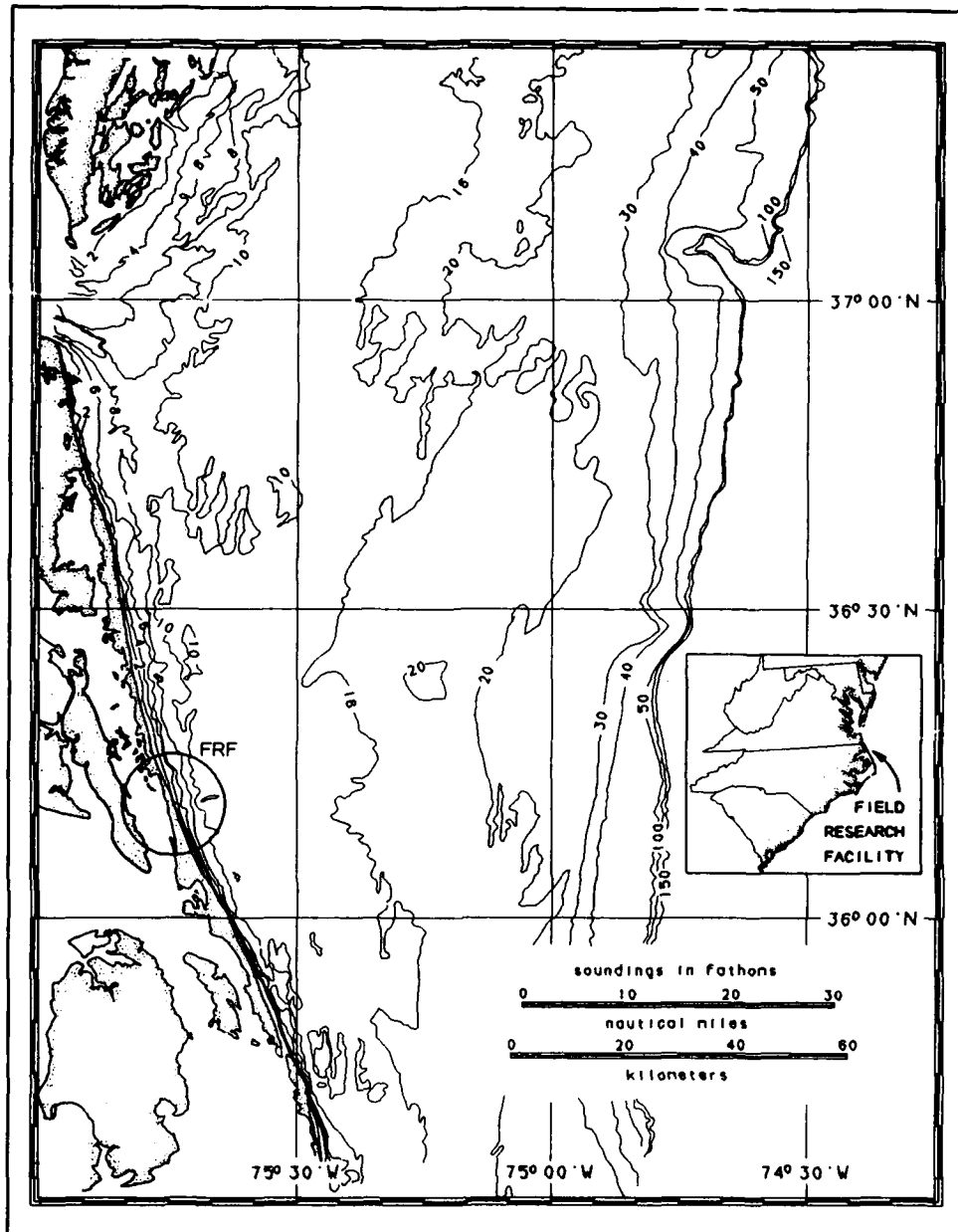
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The range and magnitude of forces due to ocean waves in the so-called wind wave frequency band (roughly 0.04 to 0.3 Hz) are of importance to an engineer estimating the durability of a natural boundary or designing a modification to such a boundary. Wind waves are among the dominant forcing mechanisms in all coastal processes. Estimation of wave forces requires knowledge of the sea state in the region of interest. Description of a sea state requires, at a minimum, an amplitude, a frequency, and a direction for each component of the wave field. Historically, there have been many observations of wave amplitude and frequency, but very few detailed observations of wave direction, due primarily to additional technical requirements in making such measurements. This represents a distinct and very important void in the knowledge required for comprehensive engineering design.

In September 1986, to begin to alleviate this dearth of knowledge, the Field Research Facility (FRF) of the Coastal Engineering Research Center, U.S. Army Engineer Waterways Experiment Station, installed a high-resolution, directional wave gauge consisting of an alongshore linear array of nine pressure gauges for long-term observations of the nearshore incident directional wave climate at its site near Duck, NC (Figure 1). In September 1990, an additional six gauges with a cross-shore alignment were incorporated, making a fifteen-element, two-dimensional spatial array for estimating wave energy propagating in all directions.

Data thus obtained, which take the form of wave frequency-direction spectra, are intended for use by the broadest possible group of researchers and application engineers and have been archived in a simple database. This report simplifies data dissemination by indexing and describing means of access to the set of observations collected during the fifth year of deployment. Similar indexes for the first 4 years of deployment are reported by Long (1991a, 1991b), Long and Smith (1993), and Long and Smith (in preparation).

The main text of this document describes and clarifies the substantial information contained in the appendixes. Brief overviews are given of the measurement site, instrumentation, data collection, and method of directional spectral estimation. These subjects are described in greater detail in other publications, to which the reader is referred. Following the overviews is a description of the archived frequency-direction spectra and some characterizing bulk parameters that can be derived from them. Appendix A is a listing



**Figure 1. Location and offshore bathymetry of the FRF**

of these characterizing parameters and is intended to be used as a catalog of the set of spectra. Appendix B contains graphs of time series of some of these parameters as a pictorial augmentation of the information in Appendix A. Appendix C illustrates a FORTRAN computer program that can be used to read archived data, of which a sample listing is given in Appendix D.

## 2 Field Research Facility

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As shown in Figure 1, the FRF is located on the barrier island chain of coastal North Carolina. A detailed description of the layout, function, and capabilities of the FRF is given by Birkemeier et al. (1985). Of particular relevance to directional wave studies are the wave-steering bathymetry and wave-generating winds.

### Bathymetry

Regarding bathymetry, the coastline in the vicinity of the FRF is nearly straight for several tens of kilometers north and south (Figure 1). It is oriented such that a shore-normal line (directed seaward) is very nearly 70 deg from true north. Waves and onshore winds can approach this site along an easterly 180-deg arc from 340 to 160 deg true. The adjacent continental shelf is wide, relatively shallow, and of somewhat complex bathymetry. The direction of nearest approach of the 100-m isobath, which indicates the shelf break, is 10 to 15 deg south of east and is about 80 km distant. A typical bottom slope for the shelf is 1 m/km, but this is interrupted by numerous features of 1- to 10-km horizontal scales and 10-m vertical scales scattered irregularly across the shelf.

Within a few kilometers of the FRF, the offshore bathymetry is more regular, with isobaths nearly shore-parallel and a bottom slope of about 2 m/km (Figure 2). Some irregularities exist. Within about 300 m of the shore, there exists a complex and mobile bar system (Birkemeier 1984) that is strongly influenced by nearshore waves and currents. These processes have also created some irregular bathymetry in the vicinity of the 600-m-long FRF research pier (Miller, Birkemeier, and DeWall 1983).

### Wave-Generating Winds

The site is subject to a variety of climates, which gives rise to a diverse set of directional wave conditions. Primary sources of high-energy waves are winds associated with hurricanes and frontal passages. Though no hurricanes passed directly over the FRF during the period covered by this report, two hurricanes (Lili and Bob) passed near enough that significant wave energy was measured at the FRF. Low-pressure weather fronts, of which several crossed the FRF site during this reporting year, were typically oriented northeast-

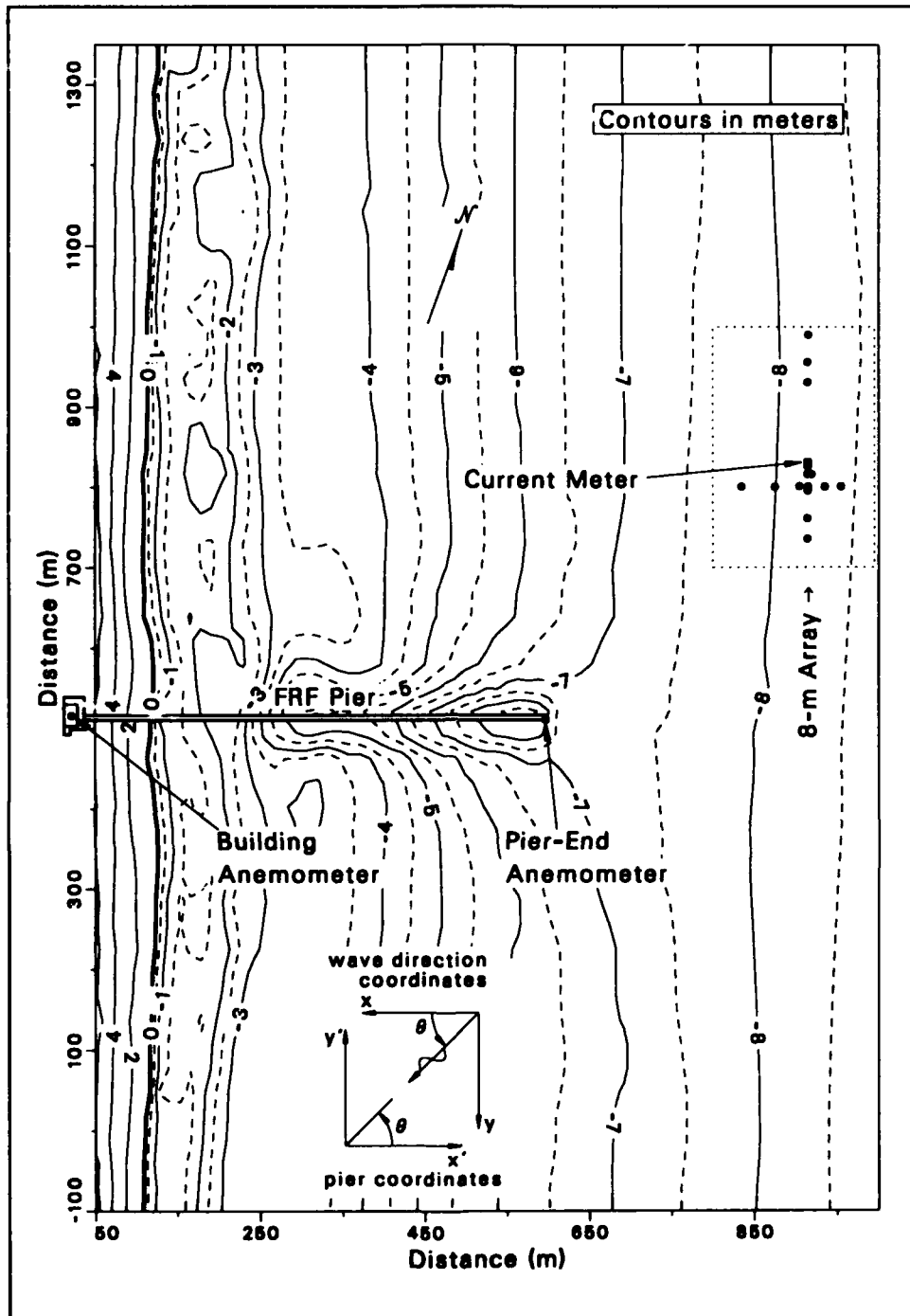


Figure 2. FRF nearshore bathymetry and coordinate system

southwest, with strong wave-generating winds coming from the northeast. Detailed, quantitative descriptions of the climate at the FRF, as determined from its arsenal of instrumentation, during the period covered by this report are given by Leffler et al. (1992, 1993).

### 3 Instrumentation

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The primary instrument in this study is a high-resolution directional wave gauge. It consists of two parts. The first is a spatial array of sensors that sample sea-surface displacement at several points in (horizontal) space. The second, described in the following section on data processing, is the mathematical treatment of these data to obtain estimates of wave directionality.

The FRF array consists of 15 pressure gauges mounted approximately 0.5 m off the bottom in the vicinity of the 8-m isobath about 900 m offshore and to the north of the research pier (Figure 2). Its location satisfies three constraints. First, it is generally outside the surf zone so that linear wave theory is applicable in data processing. Second, it is in water shallow enough that signals from 3-sec waves, the shortest periods of interest here, are detectable above background noise at the bottom-mounted gauges. Third, it is located away from the irregular isobaths around the pier and in the nearshore bar system, which helps minimize bathymetrically induced inhomogeneities in the wave field.

Spacing between gauges in the array appears irregular in Figure 2 but, for the most part, corresponds to the array-design criterion posed by Davis and Regier (1977) that every gauge pair has a unique separation. Figure 3 is an enlarged view of the array layout and shows gauge spacing as well as the gauge naming scheme. A sixteenth pressure gauge (labelled T) in Figure 3 is part of a low-resolution directional wave gauge that also includes the current meter indicated in Figure 2. Gauge T is included in the error-checking procedure described below, and was available as a backup gauge in the event of failure of certain other gauges, but was not used as part of the high-resolution array during this collection year.

The array geometry encompasses considerable ranges in both sizes and numbers of gauge separations. Minimum gauge spacing is 5 m in both the alongshore and cross-shore directions. Maximum spacing is 255 m in the alongshore direction and 120 m in the cross-shore direction. Intermediate gauge spacings are in multiples of 5 m. With 15 gauges, there are 105 possible unique spacings. In the FRF array, 12 redundant spacings are intentionally left for ancillary examination of spatial homogeneity of the wave field, so that 93 unique spacings remain.

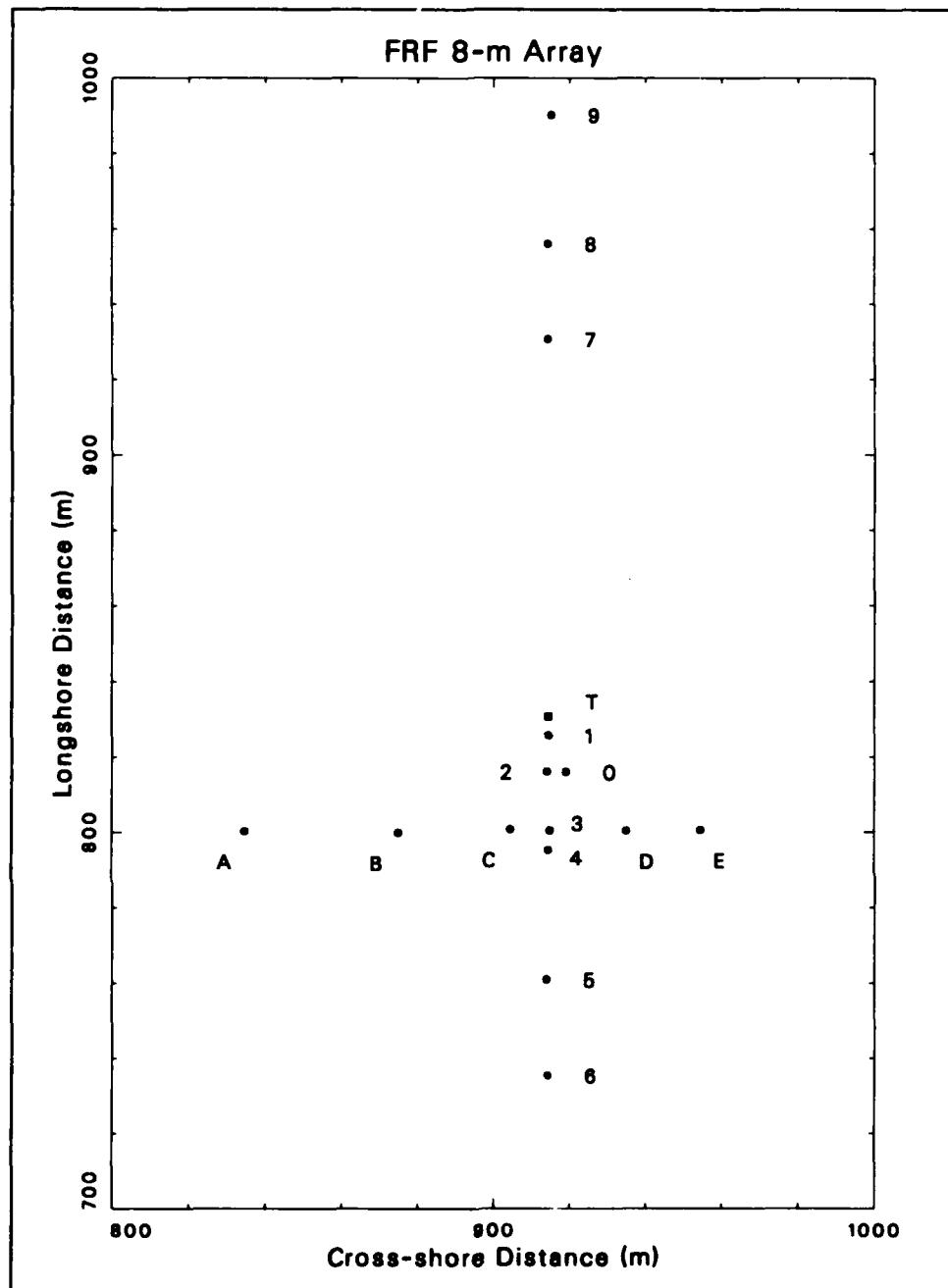


Figure 3. Spacing and numbering of linear array gauges

With the exception of gauge C, each pressure gauge is a Senso-Metric Model SP973(C), in which a piezo-electric strain gauge detects displacement of a pressure-sensitive diaphragm referenced to an evacuated cavity. Site calibrations indicate an accuracy of the pressure equivalent of  $\pm 0.006$  m of water for wave-induced fluctuations about a static water column height of 8 m. Gauge C is a Paroscientific Model 245AT resonating quartz absolute pressure transducer. The manufacturer's stated accuracy of this gauge is the pressure equivalent of  $\pm 0.003$  m of water, which is about twice as accurate as the Senso-Metric gauges.

Voltage analogs of pressure signals are hard-wired through 10-Hz, fourth-order, Butterworth filters (primarily to eliminate 60-Hz noise) to an analog-to-digital signal converter and then to a Digital Equipment Corporation VAX 11/750 computer for data acquisition. Discretization of the full-scale signal to 11-bit binary form results in a digitization step of the equivalent of 0.007 m of water, which is nearly the same as gauge accuracy.

## 4 Data Collection

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For most of this collection year, signals from each of the pressure gauges were sampled at 2 Hz and stored digitally as records of 4,096 points (34 min 8 sec). A normal collection consisted of four such records, or 16,384 points (2 hr 16 min 32 sec) for each gauge. This procedure resulted in a total of 245,760 data points to produce one frequency-direction spectrum. Starting times for normal collections are the same as those for routine FRF observations (Birkemeier et al. 1985), which occur daily at 0100, 0700, 1300, and 1900 hr Eastern Standard Time (EST). At times of high energy or when specifically requested by an investigator, additional daily collections occur at 0400, 1000, 1600, and 2200 hr EST.

An exception to the above sampling pattern occurred during September, October, and November 1990. These months encompassed two large-scale field research efforts known as SAMSON (Sources of Ambient Micro-Seismic Oceanic Noise) and DELILAH (Duck Experiment on Low-Frequency and Incident-Band Longshore and Across-Shore Hydrodynamics), some details of which are described by Birkemeier et al. (in preparation). During these experiments, data were collected at 4 Hz for durations of 2 hr 50 min 40 sec starting daily at 0100, 0400, 0700, 1000, 1300, 1600, 1900, and 2200 hr EST. To maintain consistency in directional spectral estimates, only the first 2 hr 16 min 32 sec of these records were used to obtain the results in this report. The higher sampling rate provided greater statistical confidence (degrees of freedom) for spectral results, but these results are otherwise indistinguishable from spectra that would have been obtained with the routine FRF sampling scheme.

During the period covered by this report, a total of 1,973 frequency-direction spectra were obtained. A list of data collection start times for these observations is given in Appendix A. Appendix B contains time-series plots of spectral parameters with winds and currents as auxiliary environmental variables. Locations of reference anemometers and the current meter are shown in Figure 2. Wind vectors plotted in Appendix B are derived from the pier-end anemometer shown in Figure 2.

## 5 Data Processing

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Conversion of measured time series to estimates of frequency-direction spectra requires products of frequency spectral estimates from the 15 gauges in the array. For final results to be accurate, raw input data must be of exceptionally high quality so that spiky or drifty data from one gauge do not contaminate products of results from the other gauges. Hence, the procedure for data processing is to check raw data for errors before estimating frequency-direction spectra. Some bulk parameters can then be computed to characterize results.

### Error Checking

Because multiple gauges were deployed in what was assumed to be a uniform sea, certain statistical properties of raw data from the 15 gauges should be identical. One such property is the frequency spectrum  $S(f)$  (where  $f$  is frequency)<sup>1</sup> of raw (not surface-corrected) pressure signals. Under the ideal circumstances of constant water depth, uniform gauge elevation from the bottom, and no statistical noise, frequency spectra from all gauges are identical in every detail. Though these circumstances are not met exactly in the FRF system, they are approximated sufficiently closely that an intercomparison of the frequency spectra from the array of gauges is an excellent method for identifying erroneous data records.

A convenient way to effect such an intercomparison is to overplot frequency spectra from all the gauges on a single graph. Wind wave signals attenuate with depth so that, in accordance with linearized wave theory, very little direct wind wave energy is expected in the frequency range from about 0.4 Hz out to the sampling Nyquist frequency (1.0 Hz for normal FRF sampling, and 2.0 Hz during the SAMSON and DELILAH experiments). Spectra in this frequency band should primarily indicate system noise, which should be about the same for all gauges of like kind, and consistent in time for all gauges. Excessively spiky data from one gauge appear as an increased noise level relative to other gauges. Strong low-frequency drifts in data from one gauge appear either as a deviate curve in the low-frequency part of the spectrum or as a varying mean value from segment to segment through a data record. In the pass band of wind wave frequencies for which directional

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<sup>1</sup> For convenience, symbols and abbreviations are listed in the notation (Appendix E).

estimates are computed (0.04 to 0.32 Hz for these data), one expects the frequency spectra to be nearly identical. A malfunctioning gauge is clearly identifiable in this type of intercomparison.

Figure 4 is an example of one set of overplotted frequency spectra. Semi-logarithmic coordinates have been used to emphasize the behavior of the low-energy, high-frequency spectral tails. All pressure gauge signals have been converted to equivalent heights of a static water column for convenience in interpretation. As can be seen in Figure 4, spectra in the wind wave frequency pass band are very nearly alike, indicating that all gauges are functioning reasonably well. The noise floor at high frequencies is very low relative to the wind wave signal and is nearly uniform for all but two gauges. The two exceptions are the spare gauge (gauge T in Figure 3), for which the signal follows a slightly different and intrinsically noisier electronic path to the data collection computer, and the Paroscientific gauge (gauge C in Figure 3), which has an inherently quieter background noise level than that of the other gauges.

The inset graph in Figure 4 reveals information about gauge mean values. Data records were divided into 15 half-overlapping segments having a duration of 17 min 4 sec. Segment mean values were then computed for each gauge. Ideally, when gauge means are corrected for the depth of water in which they were deployed and for the elevation of the gauge from the ocean bottom, they would all give a measure of mean water level (tidal elevation, barometric overpressure, and any wind- or wave-induced setup), which should be the same for all locations in the array for that segment of time. Experience has shown that the Senso-Metric gauges used in the 8-m array tend to have a modest mean drift over time scales of months. For the analysis used to produce this report, an estimate of true water depth was computed by finding the median of the set of corrected gauge means for each segment. The inset in Figure 4 shows the deviation of individual gauge means from this median value as a function of segment number, and indicates, for this example, mean depth errors ranging from about 0.4 m low to about 0.7 m high. By referencing all gauges to the median mean depth, potential errors in surface correcting the wind wave part of the signal are reduced.

The triangular symbol in the inset in Figure 4 shows the deviation of the median mean depth from still-water level (based on the 1929 National Geodetic Vertical Datum) as a function of segment number. The resulting curve represents the combined effects of tide, setup, and barometric overpressure. The square symbol in the inset in Figure 4 is the deviation of barometric pressure from one standard atmosphere in units of meters of sea water as a function of segment number. This curve indicates the magnitude of atmospheric pressure on pressure measurements of mean water level. This effect is removed from pressure gauge means by subtracting the excess of atmospheric pressure over one standard atmosphere from each of the gauge means.

It is noted that the present method of error checking is different from that used for results reported for the first four years of array analysis (Long 1991a, 1991b; Long and Smith 1993, in preparation). The older method

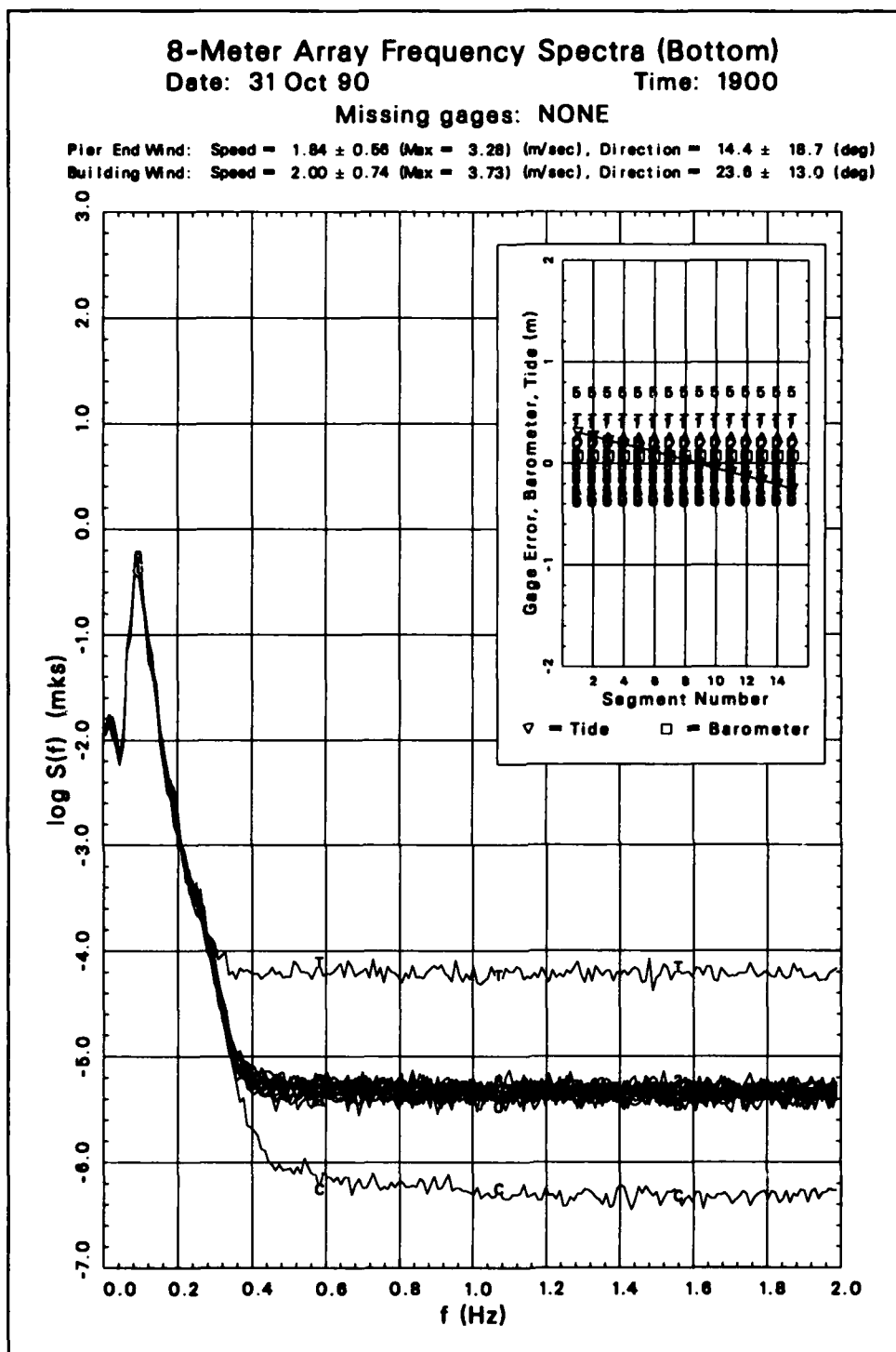


Figure 4. Example of overplotted frequency spectra

relied on moments and extremal characteristics derived from data time series in the time domain. The present method casts the data in the frequency domain, but is sensitive to the same underlying characteristics that would flag data as suspect in the older method, and is much easier to use. In both methods, if a gauge demonstrated properties that deviated too much from proper-

ties of the other gauges, it was flagged as being suspect, and the data were then further examined by hand to ensure that the flagging procedure had indeed identified a malfunctioning gauge.

If a gauge malfunctioned, it was not used in further analysis. The analysis programs were written so that data from a subset of gauges could be analyzed, so that a few gauges could be lost without seriously compromising the results. Using fewer gauges yields a somewhat reduced directional resolution. Some gauges are more critical than others. If any of the gauge pairs with 5-m spacings are lost, results become invalid at high frequencies due to aliasing. In these cases, directional analysis was truncated at a lower high-frequency limit (generally 0.24 Hz instead of the normal 0.32 Hz). As discussed in the next section, there are additional reasons for eliminating gauges from directional wave estimation at some frequencies in a spectrum. However, fewer than four gauges are never used for any frequency.

To keep track of the set of functioning and not otherwise eliminated gauges, a parameter called the *gauge pattern* was created and stored with the results for each frequency in archived directional spectra. The gauge pattern is a 16-place character string that represents which of the possible gauges (the fifteen 8-m array gauges plus the optional gauge T) were used to compute a directional spectrum at a particular frequency. The string contains the identifying characters (based on the gauge identification scheme shown in Figure 3) of gauges that were used in analysis followed by blank characters (if any) to fill out the string. This parameter can be of use in later analyses for assessing the directional resolving ability of a particular sub-array of gauges. This definition of gauge pattern differs from that used for the first 4 years of archived data, but the automated analysis algorithm was modified in September 1990 to be more dynamic in gauge selection (as described in the next section), and so necessitated this change.

## Frequency-Direction Spectra

### Two types of spectra

Data from the array of gauges are processed as two separate entities, both of which are frequency-direction spectra, but having different properties. One of the entities is a frequency-direction spectrum using only the original nine gauges (gauges 1, 2, 3, 4, 5, 6, 7, 8, and 9 in Figure 3) of the alongshore linear array. Directional spectra from this set of gauges are referred to as *linear array* results. The other entity is a frequency-direction spectrum using all gauges. Directional spectral estimates using all gauges are called *8-m array* or *full array* results.

There are several reasons for this distinction. One is that the database for the first 4 years of this study is based on results from the linear array. Comparisons of results over the full duration of the study and the accumulation of climatological statistics require a continued analysis of the linear array as a unique entity. A shortcoming of the linear array is that it can not distinguish

seaward-propagating waves from incident waves. In processing linear array data, it must be assumed that all wave energy is incident, which does not allow for the possibility of reflections from the nearshore. This problem is overcome by using the full array, which includes gauges at cross-shore locations (gauges 0, A, B, C, D, and E in Figure 3) off the line of the linear array. The full array can detect wave energy propagating in all directions, and so can be used to estimate the amount of wave energy reflected (and otherwise propagating) from the nearshore.

Ideally, the full array would be adequate for all directional spectral estimates. However, the analysis algorithm for the full array is based on the assumption that waves are propagating through water of constant depth. In fact, the depth changes by about 0.8 m over the cross-shore breadth of the array (from gauge E to gauge A), or roughly 10 percent of the total depth. Intermediate- and shallow-water waves transform, largely by refraction, as they propagate through water of changing depth. This transformation introduces a slight shift in the phase difference between waves at two cross-shore locations relative to the phase difference of waves that are not transformed. Directional spectral estimates depend critically on accurate estimates of phase difference, and the effect of transforming waves, though slight, is to introduce an increased spread in the directional distribution of wave energy, especially for waves at high angles of attack. An optical analogy is a camera with a poorly ground lens that will focus clearly at the center but is slightly blurred at the edges.

The linear array does not have this blurring effect because waves have the proper phase difference as they cross a line of constant depth. Consequently, directional spectral estimates from the linear array are better resolved in their detailed structure. Because of this better resolution, linear array results are used for all characterizing parameters except reflection coefficients in this report. Though full array results are somewhat blurred, reflection coefficients are based on total energy in 180-deg arcs of direction, and so are less sensitive to a lack of detailed resolution than are other parameters like peak direction and directional spread. Note, however, that both linear array and full array spectra and associated parameters are computed, archived, and available through the mechanisms described in this report for all collections listed in Appendix A.

### **Spectral estimation**

Estimation of the frequency-direction spectrum is done in five parts. First, a working gauge set is identified. Second, time series of pressure data from each of the working gauges are Fourier transformed to the frequency domain. Third, these transforms are converted to sea-surface displacement transforms. Fourth, cross spectra of sea-surface displacement are computed between all unique gauge pairs for each frequency. Finally, an estimate is made of a directional distribution of wave energy that corresponds to the computed spatial variation in cross-spectral density for each frequency.

The choice of gauges to be used in a frequency-direction spectrum at a particular frequency depends on available gauges after error checking (described previously), the wavelengths of the waves to be resolved, and somewhat on the nature of the directional distribution of wave energy being estimated. Ocean wave signals at a given frequency tend to become uncorrelated over distances of a few wavelengths. Cross spectra of signals from two gauges of high-frequency (short wavelength) waves are reduced to noise if the gauge separation is too great. Conversely, cross spectra of signals from two closely spaced gauges do not yield a great deal of information about very long waves because the two signals are almost identical. Because of these characteristics of ocean waves, sub-arrays of both the linear and 8-m arrays are defined so that minimum gauge spacing and maximum array extent are tuned to ranges of wind wave frequencies, and directional spectra are estimated from the gauges in these sub-arrays.

An additional constraint on gauge usage is based on the observation by Davis and Regier (1977) that occasionally the directional spectrum is of sufficiently simple shape that some of the cross-spectral information becomes redundant, meaning that too many gauges (or, perhaps, gauges in less than ideal locations) have been employed in the directional estimate. An indication of this condition is that the matrix of cross-spectral estimates becomes singular in the mathematical sense. When this occurs in the course of a computation, the procedure is to eliminate a gauge from the sub-array being used, and restart the computation. To avoid eliminating a critical gauge, an order for gauge elimination was established that retained gauges known to be important. Because this procedure occurred in automated processing, a complete gauge elimination pattern was defined, but if fewer than four gauges remained at any point in processing, the entire analysis was aborted for that collection.

Table 1 shows the wind wave frequency band sub-ranges, the sub-array of gauges to be used with each frequency sub-range, and the elimination order of gauges in each sub-array for the nine gauges of the linear array. A column under a gauge number that contains an integer indicates a gauge to be used for the frequency range shown in the left column. The integers in each row indicate the order in which gauges are to be eliminated. For example, in the

<b>Table 1</b>									
<b>Linear Array Gauge Usage</b>									
<b>Frequency Range (Hz)</b>	<b>Gauge</b>								
	1	2	3	4	5	6	7	8	9
$0.04 < f \leq 0.08$	5	1		7	4	6	8	2	3
$0.08 < f \leq 0.14$	5	2	1	6	4	7	3		
$0.14 < f \leq 0.19$	5	6	1	4	3	2			
$0.19 < f \leq 0.32$	2	3	4	5	1				

next-to-highest frequency range (next-to-last row of Table 1), gauges 1, 2, 3, 4, 5, and 6 define the sub-array. In the event that a gauge must be eliminated, gauge 3 is eliminated first. If a second gauge must be eliminated, it is gauge 6, and so on, until the four-gauge limit is reached. Table 2 shows the same type of information for the full array.

Because gauge set definition varies with frequency and is somewhat data-adaptive in that some spectra require gauge elimination and others do not, it is important that a record be kept of the set of gauges used for each frequency in a collection analysis. That is the primary purpose of the gauge pattern parameter defined previously. If data from a given gauge do not exist because the gauge has failed to perform properly, the gauge usage patterns defined by Tables 1 and 2 can be redefined as necessary, although this procedure was not required during this collection year. In any case, the gauge pattern parameter is always kept with the archived results, and the limit of a minimum of four gauges for each directional estimate is never violated. Once the appropriate set of gauges has been identified, the subsequent analysis operations of Fourier transformation, surface correction, cross-spectral computation, and directional spectral estimation can proceed.

The Fourier transform is conventional. An 8,192-sec time series is divided into 15 half-overlapping segments of 1,024 sec. Segments are tapered with a Kaiser-Bessel window (a modified Bessel function of the first kind, compensated uniformly for loss of variance due to windowing) and fast Fourier transformed. An intermediate-resolution transform is found by averaging the 15 transformed segments, frequency by frequency. Final transforms are found by then averaging results over 10 adjacent frequency bands. Final resolution bandwidth is 0.00976 Hz, and degrees of freedom are at least 150 (assuming eight contiguous segments and ignoring any gain from lapped segments). Transform estimates are retained for 29 frequency bands with band-center frequencies ranging from 0.044 to 0.318 Hz.

Conversion of pressure signals at depth to water-surface displacement is done through the linearized wave theory pressure response factor as described in the *Shore Protection Manual* (1984). After this conversion, complex cross

**Table 2**  
**8-m Array Gauge Usage**

Frequency Range (Hz)	Gauge														
	1	2	3	4	5	6	7	8	9	0	A	B	C	D	E
$0.04 < f \leq 0.08$	1	11			12	8	6	5	2		9	10	7	4	3
$0.08 < f \leq 0.12$	5	7			10	11	2	1			3	6	8	9	4
$0.12 < f \leq 0.21$	7	10	11	6	3	1				8		4	9	5	2
$0.21 < f \leq 0.32$	3	5	7	6						4			2	1	

spectra in the form of coincident and quadrature spectra are computed in the conventional way (Bendat and Piersol 1971, Jenkins and Watts 1968) between all unique gauge pairs for each frequency.

Conversion of cross-spectral patterns in lag space to directional spectra is done with the Iterative Maximum Likelihood Estimation algorithm derived and described by Pawka (1982, 1983). The algorithm is also described in application to data from heave-pitch-roll buoys by Oltman-Shay and Guza (1984). Accuracy of directional estimates depends on frequency, with high-frequency waves (short wavelengths) being better resolved by an array of finite length. Tests with artificial data indicate that the FRF linear array generally can resolve the direction of a unidirectional wave train to within 5 deg and can distinguish two wave trains at the same frequency if their directions differ by at least 15 deg.

The algorithm used here employs discrete direction "bandwidths" or arcs of about 1.0 deg for all frequencies. Because this increment is finer than the resolution of any of the arrays, directional results were integrated over 2-deg arcs and renormalized with this arc width to create evenly spaced directional spectra at all frequencies. Because linear array results are valid only in the 180-deg arc representing seaward approach directions, dividing this range into 2-deg arcs results in 91 arc center directions with which to characterize discretely the directional distribution of wave energy from the linear array. The full array can detect wave energy from all directions, so results are represented in 181 directional bins of 2-deg width (the terminal bins are redundant).

The primary result of data processing is an estimate of the discrete frequency-direction spectrum  $S(f_n, \theta_m)$ , which represents the variance of sea-surface displacement per frequency resolution bandwidth  $df$  ( $= 0.00976$  Hz) per direction resolution arc  $d\theta$  ( $= 2$  deg), where  $f_n$  is the  $n^{\text{th}}$  of  $N = 29$  discrete frequencies and  $\theta_m$  is the  $m^{\text{th}}$  of  $M = 91$  (for the linear array) or 181 (for the full array) discrete directions. In this work, direction is considered to be the angle from which wave energy is coming, measured counter-clockwise from shore-normal (Figure 2).

Numerical values of  $S(f_n, \theta_m)$  can range over many orders of magnitude, depending on the amount of energy in a given frequency band and direction arc, and this can require space-consuming formats for archiving data. To simplify this problem, frequency-direction spectra can be saved in the form of directional distribution functions  $D(f_n, \theta_m)$  defined by

$$D(f_n, \theta_m) = \frac{S(f_n, \theta_m)}{S(f_n)} \quad (1)$$

The directional distribution function has units of  $\text{deg}^{-1}$ , and its integral with respect to direction over all directions is unity.

The frequency spectrum in Equation 1 represents the sum over all directions of sea-surface variance per frequency bandwidth and is defined in terms of the frequency-direction spectrum by

$$S(f_n) = \sum_{m=1}^M S(f_n, \theta_m) d\theta \quad (2)$$

where the variables on the right-hand side are defined on the previous page. Note that this is identical to a conventional frequency spectrum that would result from a time series of sea-surface displacements at a single point in space. Because it is an integral of the frequency-direction spectrum, it is called the integrated frequency spectrum.

A directional analog of the frequency spectrum is the integrated direction spectrum, found by summing the frequency-direction spectrum over all frequencies for a fixed-direction arc. It is computed from

$$S(\theta_m) = \sum_{n=1}^N S(f_n, \theta_m) df \quad (3)$$

Figures 5 and 6 show ways to display frequency-direction spectra and the corresponding integrated frequency and integrated direction spectra from the two types of array analysis for the same collection time. Figure 5 displays results from the linear array, with some characterizing parameters shown in the figure header. Note that energy is displayed only for incident waves ( $-90 \text{ deg} < \theta < 90 \text{ deg}$ ). Figure 6 shows results from the full array. The characterizing parameters derived from this spectral estimate are the same as those for the linear array results in Figure 5, showing that the two estimates are consistent in this regard, as expected. In Figure 6, directional energy estimates cover a complete circle. The small lumps near directions of 150 deg, 180 deg, and -150 deg are indications of reflected energy.

## Bulk Parameters

Several parameters have been computed to characterize the observed spectra. There are five basic types of parameters: (a) characteristic wave height, (b) peak frequency (or its inverse, peak period), (c) peak direction, (d) directional spread, and (e) reflection coefficient. In this report, the first four of these parameters are computed from linear array results. The fifth is computed using results from the full array. Because there is more than one way to define some of these parameters, several alternate forms are presented here.

### Characteristic wave height

Characteristic wave heights from spectral observations are most frequently given as  $H_m$ , which is four times the standard deviation of sea-surface

FRF Linear Array Frequency-Direction Spectrum  
 Date: 31 Oct 90 at 1900 EST for 136.53 min with 160 dof  
 $H_{ms} = 0.60$  m  $f_{p,FD} = 0.093$  Hz  $T_{p,FD} = 10.72$  sec  
 $\theta_{p,FD} = -14.0$  deg mean depth = 7.90 m

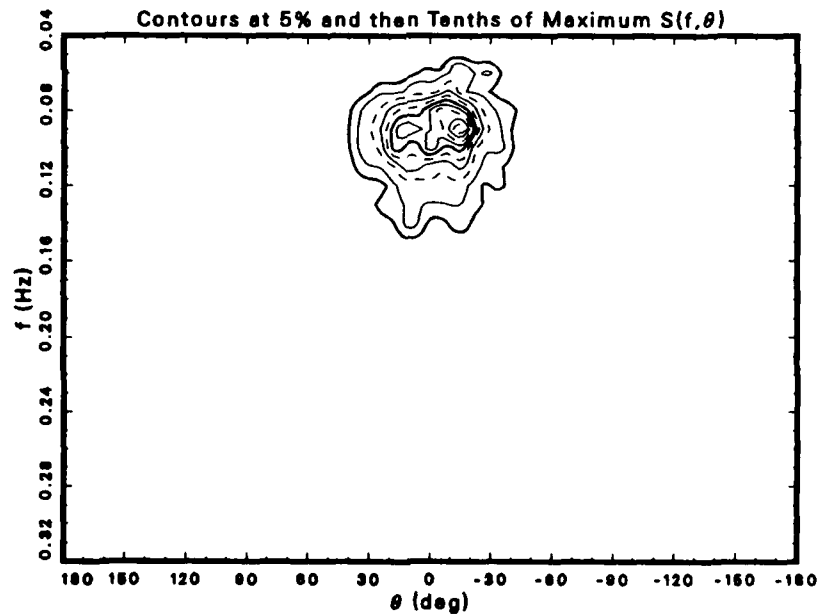
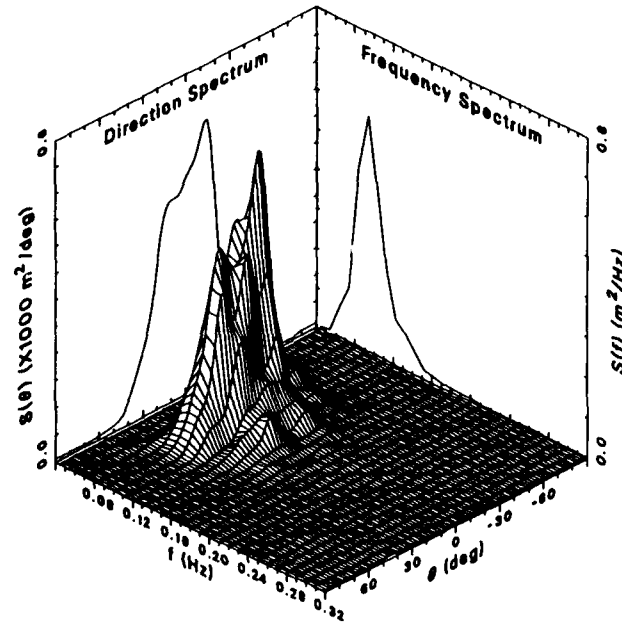


Figure 5. Example of a linear-array frequency-direction spectrum

displacement. It can be determined from the volume under the frequency-direction spectrum by the equation

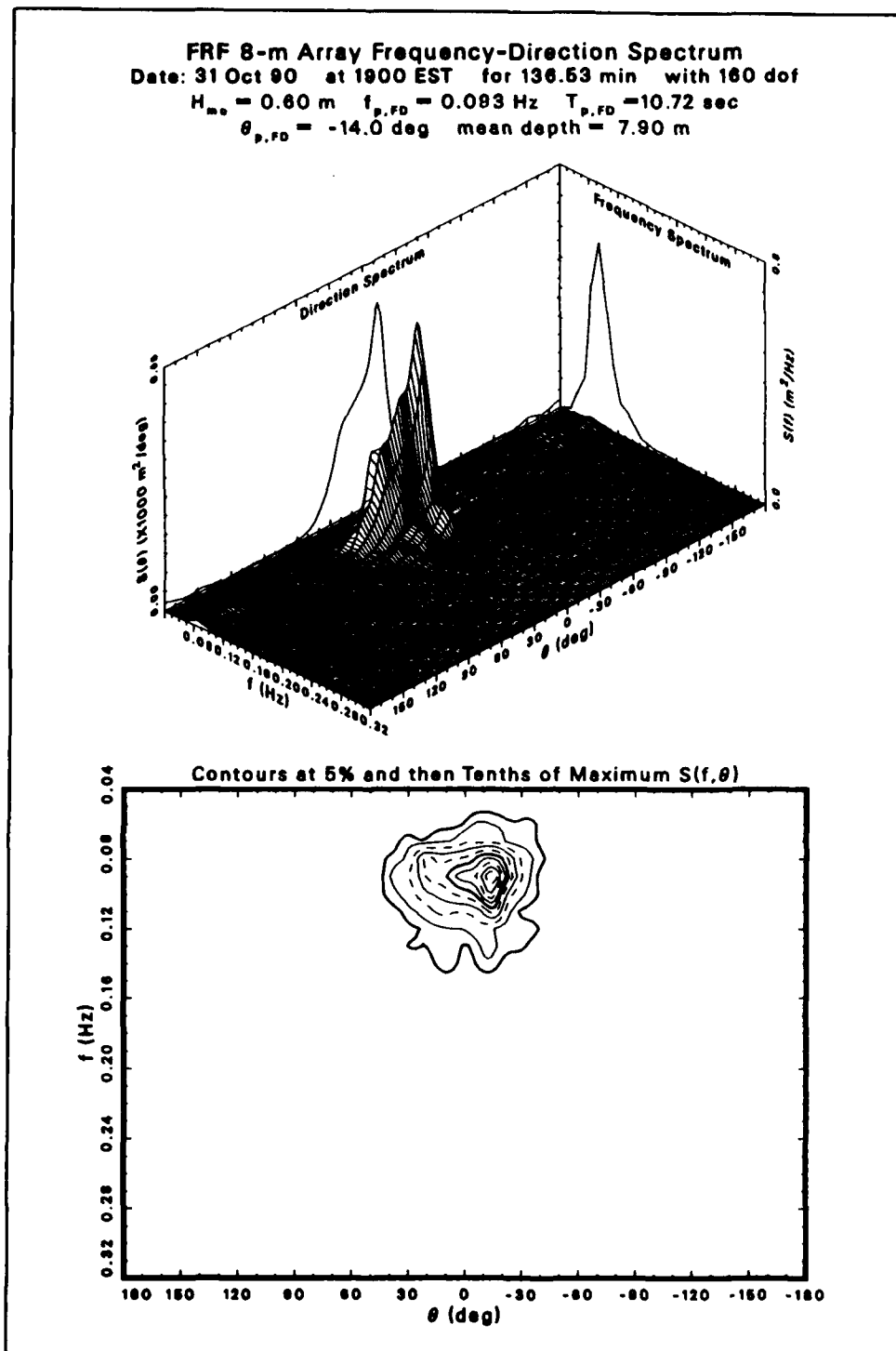


Figure 6. Example of a full-array frequency-direction spectrum

$$H_{mo}^2 = 16 \sum_{n=1}^N \sum_{m=1}^M S(f_n, \theta_m) df d\theta \quad (4)$$

It can also be found from the integrated frequency spectrum by

$$H_{mo}^2 = 16 \sum_{n=1}^N S(f_n) df \quad (5)$$

which is its more conventional definition, or from the integrated direction spectrum (Equation 3) by

$$H_{mo}^2 = 16 \sum_{m=1}^M S(\theta_m) d\theta \quad (6)$$

### Peak frequency

Peak frequency, which has the generic notation  $f_p$ , can be defined in at least two ways. One way is to find the frequency (and direction) at which the frequency-direction spectrum is maximum. This peak frequency is denoted  $f_{p,FD}$ . Another way is to find the frequency at which the integrated frequency spectrum is maximum. This is the more conventional definition, because of the plethora of measured frequency spectra, and it is denoted  $f_{p,IFS}$ . The two peak frequencies may not be the same. If the directional distribution is broad at the frequency for which the integrated frequency spectrum is maximum, it is possible that another frequency, at which the frequency-direction spectrum has a narrow directional distribution, will denote the maximum of the frequency-direction spectrum.

### Peak period

Peak period is the characteristic wave period associated with spectral peak frequency. Denoted generically by  $T_p$ , it is related to peak frequency by  $T_p = 1/f_p$ . Peak period from the frequency-direction spectrum is given by  $T_{p,FD} = 1/f_{p,FD}$ . Conventional peak period, derived from the integrated frequency spectrum, is given by  $T_{p,IFS} = 1/f_{p,IFS}$ .

### Peak direction

Peak direction is the direction representing the most energy. Given the generic symbol  $\theta_p$ , it, too, can be defined in several ways. One peak direction can be defined from the maximum of the frequency-direction spectrum. It is denoted by  $\theta_{p,FD}$ . Another peak direction can be associated with the maximum of the integrated direction spectrum, defined previously. This peak direction is denoted  $\theta_{p,IDS}$ . It can differ from  $\theta_{p,FD}$  if energy in the frequency-direction spectrum is centered at different directions for different frequencies. This condition tends to smear energy along the direction axis in the integrated direction spectrum, thereby shifting the peak relative to the peak of the frequency-direction spectrum. A third measure of peak direction is a weighted average peak direction defined by

$$\theta_{p,SW} = \frac{1}{\left(\frac{1}{4}H_{mo}\right)^2} \sum_{n=1}^N S(f_n) \theta_{p,n} \quad (7)$$

where

$\theta_{p,n}$  = peak direction of the directional distribution at the  $n^{th}$  frequency of the frequency-direction spectrum

$S(f_n)$  = integrated frequency spectrum from Equation 2

and  $H_{mo}$  is defined by Equation 4. This definition gives higher weights to the more energetic peak directions but does not rely on the single distribution with the most energy.

### Directional spread

A fourth type of characteristic parameter is directional spread. This parameter, denoted generically as  $\Delta\theta$ , gives a measure of the range of directions from which some significant fraction of energy is propagating. The basic definition used here is the arc subtended by the middle two quartiles of a directional distribution. As illustrated in Figure 7, the directional distribution function  $D(f_n, \theta_m)$  for a particular frequency  $f_n$  can be integrated from one bounding direction (here the shore-parallel direction at +90 deg) to some arbitrary direction  $\theta_j$  to make a kind of cumulative distribution function  $I(f_n, \theta_j)$ . The formal definition is

$$I(f_n, \theta_j) = \sum_{m=1}^j D(f_n, \theta_m) d\theta \quad (8)$$

where  $j$  is the index of a discrete angle bin. The three quartile directions, called  $\theta_{25\%,n}$ ,  $\theta_{50\%,n}$ , and  $\theta_{75\%,n}$ , respectively, satisfy the equations

$$I(f_n, \theta_{25\%,n}) = 0.25 \quad (9)$$

$$I(f_n, \theta_{50\%,n}) = 0.50 \quad (10)$$

$$I(f_n, \theta_{75\%,n}) = 0.75 \quad (11)$$

A directional spread parameter for the  $n^{th}$  frequency is defined by

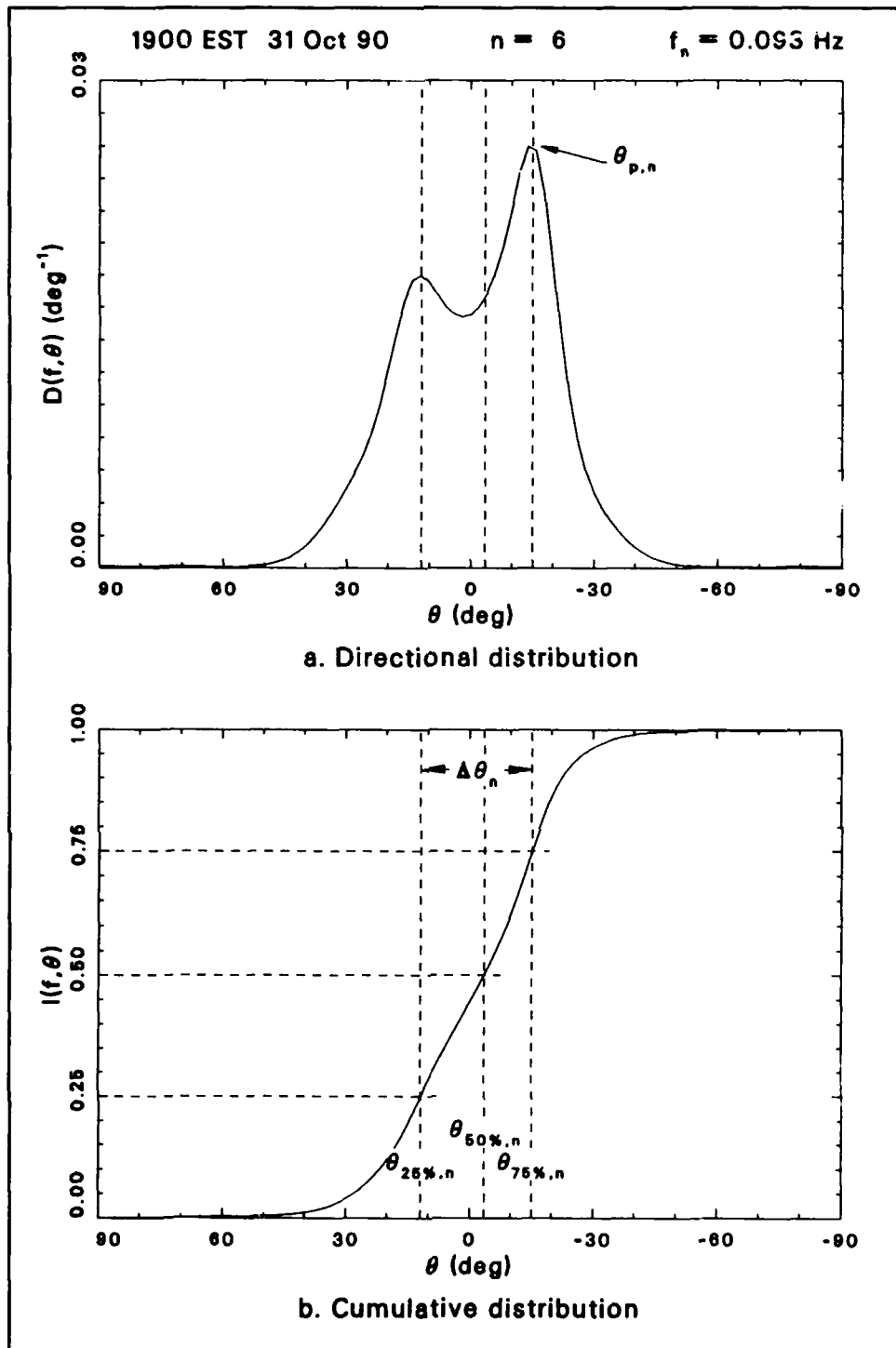


Figure 7. Directional spread computation

$$\Delta\theta_n = \theta_{25\%,n} - \theta_{75\%,n} \quad (12)$$

If Equation 12 is applied at the frequency where the frequency-direction spectrum is maximum, a measure of directional spread at the peak of the

frequency-direction spectrum is obtained. This parameter is denoted  $\Delta\theta_{FDP}$ . If, instead of a directional distribution function at a single frequency, the normalized integrated direction spectrum is used in the set of Equations 8 to 12, a measure of bulk directional spread is obtained. This parameter is given the symbol  $\Delta\theta_{IDS}$ . A third measure of directional spread is found from a spectrally weighted average of the spreads at each frequency. Denoted as  $\Delta\theta_{SW}$ , this parameter is found from

$$\Delta\theta_{SW} = \frac{1}{\left(\frac{1}{4}H_{mo}\right)^2} \sum_{n=1}^N S(f_n) \Delta\theta_n \quad (13)$$

Equation 13 is like Equation 7 for the spectrally weighted peak direction.

### Reflection coefficient

Following the definition in the *Shore Protection Manual* (1984), a reflection coefficient is a ratio of incident wave height to reflected wave height. This simple definition is based on the concept of unidirectional, monochromatic waves, which almost never occur in the real ocean. An adaptation of this definition for the purposes of this report is to use characteristic incident wave height  $H_{mo,i}$  and characteristic reflected wave height  $H_{mo,r}$  to define an energy-based reflection coefficient  $\chi$  as

$$\chi = \frac{H_{mo,r}}{H_{mo,i}} \quad (14)$$

Incident and reflected wave heights are defined in terms of incident and reflected energy. Squaring both sides of Equation 14 then yields an estimate of the ratio of total reflected to total incident wind wave energy, a characteristic that may be useful in consideration of nearshore dynamics.

Some care must be exercised both in defining and interpreting the characteristic wave heights and their ratio. Intrinsic in all spectral estimates is some level of background system and analysis noise that is not related to wave signals, is often unevenly distributed in direction, and is capable of severely degrading a ratio of entities like that in Equation 14. In a rough attempt to minimize the effects of background noise, a noise estimate is made by finding the minimum of the frequency-direction spectrum at each frequency  $S_{min}(f_n)$ , and computing incident energy  $E_i$  and reflected energy  $E_r$  relative to these minima. Using the full-array frequency-direction spectrum for these computations, the incident energy is

$$E_i = \rho g \sum_{n=1}^N \sum_{m=46}^{136} w_m [S(f_n, \theta_m) - S_{min}(f_n)] d\theta df \quad (15)$$

and the reflected energy is

$$\begin{aligned}
E_r = \rho g \sum_{n=1}^N \sum_{m=1}^{46} w_m [S(f_n, \theta_m) - S_{\min}(f_n)] d\theta df \\
+ \rho g \sum_{n=1}^N \sum_{m=136}^M w_m [S(f_n, \theta_m) - S_{\min}(f_n)] d\theta df
\end{aligned} \tag{16}$$

where all  $w_m = 1$ , except  $w_1 = w_{46} = w_{136} = w_M = \frac{1}{2}$ . The  $w_m$  are simply convenient notations that show the proper contributions of the spectrum to the end points of the sums in Equations 15 and 16, and do not otherwise affect the integrations. In terms of incident and reflected energies, the corresponding

characteristic wave heights are  $H_{mo,i} = 4\sqrt{E_i/\rho g}$  and  $H_{mo,r} = 4\sqrt{E_r/\rho g}$ , so that, on substitution into Equation 14, the reflection coefficient becomes

$$\chi = \sqrt{\frac{E_r}{E_i}} \tag{17}$$

The simple noise estimate used here does not eliminate the effects of noise in computing Equation 17 using Equations 15 and 16. This condition is evident in the tabular listings in Appendix A and the plotted results in Appendix B. There is a persistent background level of  $\chi \approx 0.1$ , which suggests that there is always about 1 percent of incident wave energy propagating back out to sea, a condition that is unlikely to be true. Synthetic data tests by Long and Oltman-Shay (1993) using the algorithms described in this report with a similar array of gauges indicate errors as large as 200 percent for  $\chi \approx 0.1$ , but with the error dropping rapidly for larger  $\chi$ . A reasonable way to interpret the results in this report is to consider  $\chi \geq 0.2$  as indicative of some reflection, and then to examine such spectra in detail for verification. In the spectrum shown in Figure 6, for example, the tabulated reflection coefficient is 0.23, and the figure does indeed indicate some reflection peaks.

### Parameter summary

Together, the 12 parameters  $H_{mo}$ ,  $f_{p,FD}$ ,  $f_{p,IFS}$ ,  $T_{p,FD}$ ,  $T_{p,IFS}$ ,  $\theta_{p,FD}$ ,  $\theta_{p,IDS}$ ,  $\theta_{p,SW}$ ,  $\Delta\theta_{IDS}$ ,  $\Delta\theta_{SW}$ ,  $\Delta\theta_{FDP}$ , and  $\chi$  give a bulk characterization of some properties of the frequency-direction spectra discussed in this report. There are, of course, many other parameters that can be defined, but the present set is simple and is easier to use than the 2,639 discrete spectral densities (29 frequencies  $\times$  91 directions) required for a full description of any linear array spectrum, or the 5,249 elements (29 frequencies  $\times$  181 directions) of any full-array spectrum discussed here.

## 6 Archived Results

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Optical disks containing the sets of observed linear-array and full-array frequency-direction spectra from this fifth year of data collection have been created to archive the observations. Appendix A contains a listing of the date, starting time, and the characterizing parameters defined previously for each case archived for the present year. It is intended to be used as a kind of index or catalog of the set of available cases. For reasons explained below, dates in Appendix A are given in the form *yymmdd* where *yy* is a two-digit year indicator (e.g., 90 means 1990), *mm* is the numeric index of the calendar month (i.e., 01 is January, 12 is December, etc.), and *dd* is day of the month. All times are Eastern Standard Time. A 24-hr clock is used.

Graphic representations of data collection times, some bulk parameters, and some auxiliary environmental variables are contained in Appendix B. One graph is shown for each month of the collection year. The upper part of each graph has time series plots of the bulk parameters  $H_{mo}$ ,  $T_{p,IFS}$ ,  $\theta_{p,IDS}$ , and  $\Delta\theta_{IDS}$  derived from the linear array, and  $\chi$  derived from the full array. The lower part of each graph has stick figure plots of three environmental variables. First is a kind of crude wave vector in which the stick vector has a length proportional to  $H_{mo}$  and a direction given by  $\theta_{p,IDS} + 180$  deg. The 180 deg is added to provide a physical frame of reference consistent with a vector pointing in the direction of energy propagation. Because peak wave energy is always directed onshore, all stick vectors in this part of the graph will have a component directed upward on the page.

The second stick figure plot is the wind vector as measured with the FRF pier-end anemometer. Mounted at the seaward end of the FRF pier (Figure 2) at an elevation 19.5 m above mean sea level, this instrument gives a reasonable estimate of the wind climate in the vicinity of the linear array.

Because winds are very important in wave generation and modification, wind data from both of the anemometers indicated in Figure 2 are archived with spectral results. The building anemometer is also 19.5 m above mean sea level. Both anemometers are of the impeller-vane type. Anemometer data are vector averaged and wind velocity variances are computed both in and perpendicular to the mean wind direction. Archived with wave spectral results are mean wind speed, maximum wind speed, wind speed standard deviation, mean wind direction, and a measure of wind direction standard

deviation (defined as the arc tangent of the ratio of cross-stream standard deviation of wind velocity to the mean wind speed).

The third stick figure plot is the current vector as measured with a current meter located on the line of the linear array, about 5 m northward of gauge 1 (Figure 2). Note that this current meter is in a different location from the one used in the first three directional spectral index reports (Long 1991a, 1991b; Long and Smith 1993). This instrument was approximately 2.4 m off the bottom in water about 8 m deep and, therefore, sensed currents near the bottom. All available current data are plotted. The current meter was subject to storm damage, biological fouling, and duration-related electronic problems, so that data are not available for some of the months covered by this report. Of existing data, the reader may note a significant anticorrelation between cross-shore winds and cross-shore currents. This is consistent with the behavior of wall-bounded, shallow-water, wind-generated currents. Additional details about the anemometer and current meter are given by Birkemeier et al. (1985).

## 7 Retrieving Processed Data

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The electro-optical medium containing the directional-spectral data archive is compact, but not very transportable. Consequently, a conversion program has been written to transform the data into a rather conventional, 80-column, formatted form that is much more easily distributed on common magnetic media. A user requesting some or all of the data will, by default, receive the data in formatted form. It may be possible to transfer the data in other ways, and specific requests can be coordinated with the FRF.

The data archive for the period covered by this report contains two sets of 1,973 files, one set for linear array results, and the other for full array results, with a file for each collection. When converted to formatted form, a linear array file has a length of about 30,000 bytes and a full array file is about twice this size, so the complete archive for the fifth collection year contains roughly 178 MB of information. A user may wish to consider whether this quantity of information will take too much system space before trying to copy the whole archive. Subsets of data can be created by reading the data archive one file at a time.

A formatted file is usually named *layymmddhhmm.asc*, where *la* stands for linear-array frequency-direction spectrum, or *fdymmddhhmm.asc*, where *fd* means a full-array frequency-direction spectrum, and *asc* indicates the files are in ASCII form. The character grouping *yymmdd* represents the data collection date (as listed in Appendix A), and the character grouping *hhmm* represents the data collection start time (also from Appendix A).

Once a file is on equipment and in a position to be read, it can be input to a computer program through any ASCII-formatted read statement. Appendix C contains a listing of a FORTRAN program that can read the formatted data files. The variables contained in a data file are listed in the header of the program in Appendix C. A listing of a sample data file of linear-array results is given in Appendix D. The read statements in the program in Appendix C can be visually aligned with the data fields of the listing in Appendix D if the user wishes to edit or visually read a data file. Program variable names, especially those that have parallel symbols in this text, are also listed in the Notation (Appendix E).

**A user can obtain data by directing a request to:**

**Chief, Field Research Facility  
1261 Duck Road  
Kitty Hawk, NC 27949-4472  
Phone: (919) 261-3511  
Fax: (919) 261-4432**

## 8 Summary of Results

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Data from the fifth collection year of high-resolution, directional-spectral observations at the FRF have been put in a form that is easily accessible to researchers interested in nearshore processes. Directional gauge array, directional analysis algorithms, and definitions of characterizing parameters are described in the body of this report, as are the location and form of archived data. Both a listing and a graphic presentation of data collection times and characteristic parameters are given in the appendixes. The appendixes also contain a sample data file and a listing of a FORTRAN program that can be used to read a data file.

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# Appendix A

## Table of Collection Times and Bulk Parameters

Table A1 Collection Times and Bulk Parameters														
Date	Time EST	$H_{ms}$ m	$f_{p,JO}$ Hz	$f_{p,FS}$ Hz	$T_{p,JO}$ sec	$T_{p,FS}$ sec	$\theta_{p,JO}$ deg	$\theta_{p,DS}$ deg	$\theta_{p,SW}$ deg	$\Delta\theta_{DS}$ deg	$\Delta\theta_{SW}$ deg	$\Delta\theta_{DP}$ deg	$\chi$	
900901	0100	1.14	0.093	0.083	10.72	11.98	-20.0	16.0	2.1	42.5	22.7	23.0	0.16	
900901	0400	1.10	0.093	0.093	10.72	10.72	-22.0	-20.0	0.2	38.7	22.0	17.9	0.17	
900901	0700	1.12	0.083	0.093	11.98	10.72	-18.0	-2.0	1.2	35.3	23.2	20.3	0.18	
900901	1000	1.35	0.044	0.093	22.51	10.72	0.0	0.0	-6.1	25.6	21.1	22.6	9.99	
900901	1300	1.14	0.103	0.093	9.71	10.72	-24.0	-12.0	-7.6	30.9	24.0	21.1	9.99	
900901	1600	1.07	0.083	0.093	11.98	10.72	-28.0	-16.0	-10.8	31.2	23.3	24.1	9.99	
900901	1900	0.99	0.093	0.093	10.72	10.72	-22.0	-12.0	-15.4	32.6	25.4	19.8	9.99	
900901	2200	0.93	0.103	0.093	9.71	10.72	-28.0	-12.0	-10.9	32.1	27.7	32.9	9.99	
900902	0100	0.95	0.093	0.093	10.72	10.72	-20.0	-18.0	-10.9	31.0	27.6	22.8	9.99	
900902	0400	0.89	0.083	0.093	11.98	10.72	-22.0	-12.0	-9.1	33.4	30.4	33.7	9.99	
900902	0700	0.82	0.093	0.093	10.72	10.72	-36.0	-10.0	-11.3	31.1	28.8	34.6	9.99	
900902	1000	0.86	0.064	0.064	15.63	15.63	-12.0	-12.0	-12.8	26.9	24.2	24.4	9.99	
900902	1300	0.92	0.064	0.064	15.63	15.63	-10.0	-10.0	-12.0	24.6	24.9	22.8	9.99	
900902	1600	0.91	0.064	0.064	15.63	15.63	-14.0	-12.0	-14.3	25.6	25.4	21.7	9.99	
900902	1900	0.91	0.074	0.074	13.56	13.56	-8.0	-8.0	-12.4	22.9	22.6	19.3	9.99	
900902	2200	0.77	0.074	0.074	13.56	13.56	-10.0	-10.0	-15.3	25.1	24.7	21.9	9.99	
900903	0100	0.72	0.074	0.074	13.56	13.56	-8.0	-10.0	-17.0	25.3	24.0	21.9	9.99	
900903	0400	0.68	0.083	0.083	11.98	11.98	-8.0	-8.0	-16.6	26.2	25.1	21.5	9.99	
900903	0700	0.68	0.083	0.083	11.98	11.98	-8.0	-10.0	-15.6	29.8	32.8	19.8	9.99	
900903	1000	0.59	0.083	0.093	11.98	10.72	-12.0	-12.0	-16.8	25.8	25.1	26.4	9.99	
900903	1300	0.59	0.093	0.093	10.72	10.72	-14.0	-12.0	-14.6	23.8	24.6	22.2	0.21	
900903	1600	0.98	0.093	0.230	10.72	4.35	-14.0	-14.0	26.0	61.9	32.3	39.9	0.18	
900903	1900	1.46	0.083	0.181	11.98	5.52	-14.0	36.0	31.0	37.8	23.6	18.9	0.15	
900903	2200	1.69	0.162	0.162	6.19	6.19	30.0	28.0	26.3	38.2	23.9	13.7	0.14	
900904	0100	1.82	0.142	0.152	7.04	6.59	20.0	20.0	20.9	37.0	27.9	19.0	0.12	
900904	0400	1.78	0.142	0.152	7.04	6.59	18.0	20.0	26.4	35.8	26.2	20.1	0.14	
900904	0700	1.67	0.083	0.083	11.98	11.98	-14.0	34.0	21.7	38.9	25.5	13.8	0.16	
900904	1000	1.75	0.123	0.123	8.16	8.16	10.0	18.0	14.9	35.6	26.2	22.1	0.13	
900904	1300	1.85	0.132	0.123	7.56	8.16	10.0	16.0	21.0	32.6	25.7	25.1	0.13	
900904	1600	1.84	0.123	0.123	8.16	8.16	10.0	12.0	16.9	28.4	25.8	21.9	0.15	
900904	1900	1.74	0.113	0.113	8.87	8.87	18.0	16.0	17.0	31.3	27.4	26.1	0.15	
900904	2200	1.63	0.123	0.113	8.16	8.87	18.0	16.0	12.7	29.6	26.6	27.4	0.12	
900905	0100	1.56	0.083	0.103	11.98	9.71	-10.0	10.0	9.2	28.8	25.9	25.2	0.11	
900905	0400	1.47	0.093	0.103	10.72	9.71	-6.0	14.0	8.7	28.0	25.0	23.4	0.12	
900905	0700	1.51	0.083	0.083	11.98	11.98	-12.0	-12.0	4.4	28.8	24.2	18.5	0.16	
900905	1000	1.42	0.103	0.103	9.71	9.71	-14.0	14.0	2.9	28.4	26.7	28.0	0.14	
(Sheet 1 of 37)														

(Sheet 1 of 37)

Table A1 (Continued)

Date	Time EST	H <sub>m</sub> m	f <sub>p,FD</sub> Hz	f <sub>p,FS</sub> Hz	T <sub>p,FD</sub> sec	T <sub>p,FS</sub> sec	θ <sub>p,FD</sub> deg	θ <sub>p,DS</sub> deg	θ <sub>p,SW</sub> deg	Δθ <sub>DS</sub> deg	Δθ <sub>SW</sub> deg	Δθ <sub>DP</sub> deg	χ
900905	1300	1.30	0.103	0.113	9.71	8.87	-8.0	14.0	7.9	28.1	26.7	28.7	0.13
900905	1600	1.12	0.142	0.103	7.04	9.71	8.0	8.0	5.6	25.5	24.6	27.6	0.14
900905	1900	1.04	0.103	0.103	9.71	9.71	-12.0	14.0	4.8	26.7	24.9	24.1	0.16
900905	2200	0.93	0.093	0.103	10.72	9.71	-12.0	-8.0	-0.4	28.2	25.2	24.7	0.15
900906	0100	0.97	0.103	0.103	9.71	9.71	-10.0	-12.0	-5.5	26.5	24.7	24.6	0.12
900906	0400	0.89	0.103	0.113	9.71	8.87	-12.0	-12.0	-2.9	27.1	26.1	25.3	0.14
900906	0700	0.85	0.103	0.103	9.71	9.71	-10.0	-8.0	-2.0	26.1	25.2	25.0	9.99
900906	1000	0.76	0.103	0.113	9.71	8.87	-14.0	-10.0	-6.7	27.0	26.3	25.8	9.99
900906	1300	0.70	0.113	0.113	8.87	8.87	-10.0	-4.0	-4.2	26.3	26.2	30.0	9.99
900906	1600	0.66	0.123	0.113	8.16	8.87	-14.0	-10.0	-6.9	29.1	25.1	28.1	0.19
900906	1900	0.58	0.103	0.113	9.71	8.87	-10.0	-10.0	-5.2	33.5	26.9	26.1	0.24
900906	2200	0.54	0.113	0.113	8.87	8.87	-10.0	-10.0	-6.6	32.2	31.2	25.8	0.20
900907	0100	0.50	0.123	0.113	8.16	8.87	4.0	4.0	-5.0	31.7	30.1	34.4	0.13
900907	0400	0.53	0.123	0.123	8.16	8.16	-12.0	-10.0	-7.9	33.1	31.6	32.5	0.20
900907	0700	0.49	0.113	0.123	8.87	8.16	-14.0	-12.0	-11.8	32.0	30.3	27.1	0.23
900907	1000	0.46	0.113	0.113	8.87	8.87	-32.0	-12.0	-16.8	33.7	31.4	34.8	0.25
900907	1600	0.45	0.289	0.113	3.47	8.87	-58.0	-58.0	-24.6	35.9	25.6	30.0	0.20
900907	1900	0.42	0.123	0.123	8.16	8.16	-30.0	-18.0	-27.3	33.4	29.7	29.6	0.28
900907	2200	0.41	0.123	0.123	8.16	8.16	-40.0	-20.0	-29.8	32.4	33.5	32.4	0.27
900908	0100	0.46	0.132	0.132	7.56	7.56	-28.0	-24.0	1.9	66.3	28.3	26.4	0.17
900908	0400	0.45	0.132	0.132	7.56	7.56	-38.0	-20.0	-15.7	33.6	31.8	29.7	0.20
900908	0700	0.66	0.279	0.289	3.59	3.47	52.0	56.0	24.7	66.6	30.7	25.4	0.21
900908	1000	1.01	0.210	0.230	4.75	4.35	50.0	50.0	41.0	30.3	25.7	19.5	0.16
900908	1300	1.28	0.171	0.171	5.83	5.83	42.0	44.0	39.3	25.1	23.9	16.9	0.13
900908	1600	1.64	0.142	0.152	7.04	6.59	20.0	20.0	31.6	23.6	23.9	18.4	0.14
900908	1900	1.57	0.132	0.132	7.56	7.56	24.0	22.0	27.8	24.6	25.0	15.6	0.13
900908	2200	1.67	0.132	0.123	7.56	8.16	10.0	12.0	20.0	27.1	29.7	18.0	0.11
900909	0100	1.65	0.123	0.113	8.16	8.87	18.0	18.0	16.3	28.3	30.2	20.4	0.11
900909	0400	1.47	0.123	0.113	8.16	8.87	8.0	10.0	12.5	29.1	28.3	21.3	0.11
900909	0700	1.38	0.113	0.113	8.87	8.87	-8.0	12.0	10.5	31.8	30.5	23.8	0.13
900909	1000	1.27	0.103	0.113	9.71	8.87	16.0	18.0	16.4	31.5	31.2	23.3	0.15
900909	1300	1.15	0.123	0.113	8.16	8.87	18.0	16.0	14.7	27.6	27.9	17.3	0.13
900909	1600	1.09	0.123	0.123	8.16	8.16	14.0	12.0	12.0	28.4	28.4	19.0	0.12
900909	1900	1.02	0.123	0.123	8.16	8.16	6.0	10.0	9.9	28.1	28.9	19.0	0.13
900909	2200	0.91	0.123	0.113	8.16	8.87	10.0	12.0	11.4	32.2	33.1	32.1	0.15
900910	0100	0.81	0.113	0.113	8.87	8.87	12.0	12.0	11.0	31.9	32.9	29.9	0.13
900910	0400	0.79	0.113	0.113	8.87	8.87	6.0	10.0	4.7	30.5	31.6	24.3	0.12
900910	1000	0.83	0.123	0.123	8.16	8.16	14.0	-8.0	-0.1	29.9	29.1	27.8	0.18
900910	1300	0.80	0.103	0.103	9.71	9.71	-8.0	8.0	-1.2	27.6	28.2	19.8	0.16
900910	1600	0.74	0.103	0.103	9.71	9.71	-12.0	12.0	1.8	29.8	28.9	22.3	0.12
900910	1900	0.70	0.103	0.113	9.71	8.87	-10.0	8.0	-0.6	27.9	28.4	23.1	0.14
900910	2200	0.65	0.103	0.103	9.71	9.71	-6.0	-12.0	-1.1	28.1	28.8	15.7	0.18
900911	0100	0.64	0.103	0.113	9.71	8.87	-14.0	-14.0	-4.1	28.9	29.4	21.7	0.17
900911	0400	0.68	0.103	0.113	9.71	8.87	-12.0	-12.0	0.7	31.4	30.8	28.7	0.13
900911	0700	0.74	0.113	0.123	8.87	8.16	-10.0	-10.0	7.2	32.4	28.8	20.2	0.14
900911	1000	0.76	0.064	0.113	15.63	8.87	-14.0	-12.0	10.9	39.4	30.6	22.4	0.19
900911	1300	0.77	0.064	0.064	15.63	15.63	-26.0	-12.0	3.9	45.5	29.8	20.4	0.23
900911	1600	0.79	0.074	0.074	13.56	13.56	-14.0	-14.0	4.0	39.2	28.1	12.8	0.18
900911	1900	0.86	0.074	0.074	13.56	13.56	-16.0	-14.0	0.0	32.3	27.9	15.3	0.23
900911	2200	0.89	0.074	0.074	13.56	13.56	-28.0	-10.0	-12.2	32.2	29.3	24.8	0.31
900912	0100	0.91	0.074	0.074	13.56	13.56	-26.0	-14.0	-10.3	31.1	28.5	24.9	0.22
900912	0400	0.86	0.074	0.074	13.56	13.56	-14.0	-14.0	-10.1	29.3	26.4	21.1	0.20
900912	0700	0.91	0.064	0.074	15.63	13.56	-10.0	-12.0	-8.7	27.8	27.4	27.9	0.19
900912	1000	0.99	0.074	0.074	13.56	13.56	-10.0	-12.0	-7.6	30.5	28.4	25.7	0.25
900912	1300	1.09	0.074	0.074	13.56	13.56	-26.0	-14.0	-10.5	29.9	28.8	31.0	0.26
900912	1600	1.03	0.074	0.074	13.56	13.56	-24.0	-14.0	-6.8	31.1	28.2	28.5	0.21
900912	1900	1.04	0.074	0.074	13.56	13.56	-12.0	-12.0	-8.3	28.4	25.7	24.2	0.21
900912	2200	1.01	0.083	0.074	11.98	13.56	-22.0	-10.0	-7.1	31.5	28.0	30.3	0.25

(Sheet 2 of 37)

Table A1 (Continued)

Date	Time EST	H <sub>m</sub> m	f <sub>p,FD</sub> Hz	f <sub>p,FS</sub> Hz	T <sub>p,FD</sub> sec	T <sub>p,FS</sub> sec	θ <sub>p,FD</sub> deg	θ <sub>p,DS</sub> deg	θ <sub>p,SW</sub> deg	Δθ <sub>DS</sub> deg	Δθ <sub>SW</sub> deg	Δθ <sub>FD</sub> deg	χ
900913	0100	0.94	0.083	0.074	11.98	13.56	-20.0	-20.0	-11.4	30.1	25.4	25.4	0.26
900913	0400	0.90	0.074	0.074	13.56	13.56	-12.0	-20.0	-10.7	28.9	25.1	24.5	0.22
900913	0700	0.89	0.083	0.083	11.98	11.98	-10.0	-12.0	-7.6	29.1	26.6	26.8	0.19
900913	1000	0.91	0.083	0.083	11.98	11.98	-12.0	-12.0	-9.3	26.1	24.3	18.9	0.22
900913	1300	0.93	0.083	0.083	11.98	11.98	-10.0	-12.0	-7.5	30.4	29.8	26.4	0.25
900913	1600	0.91	0.083	0.083	11.98	11.98	-10.0	-14.0	-7.9	32.9	31.6	30.8	0.26
900913	1900	1.05	0.074	0.083	13.56	11.98	-14.0	-14.0	-10.1	31.9	29.9	32.2	0.19
900913	2200	1.06	0.083	0.083	11.98	11.98	-18.0	-14.0	-9.8	32.1	31.0	28.9	0.21
900914	0100	1.02	0.074	0.083	13.56	11.98	-10.0	-12.0	-7.7	31.4	32.0	30.2	0.23
900914	0400	1.04	0.074	0.074	13.56	13.56	-10.0	-10.0	-10.0	31.0	31.6	29.8	0.25
900914	0700	1.08	0.083	0.083	11.98	11.98	-14.0	-14.0	-10.5	28.4	28.7	22.7	0.17
900914	1000	1.08	0.074	0.074	13.56	13.56	-8.0	-8.0	-10.4	30.3	29.5	24.4	0.20
900914	1300	1.08	0.083	0.083	11.98	11.98	-14.0	-12.0	-6.2	28.3	28.7	25.0	0.24
900914	1600	0.98	0.074	0.074	13.56	13.56	-10.0	-10.0	-8.4	29.5	29.7	25.7	0.26
900914	1900	0.92	0.083	0.083	11.98	11.98	-8.0	-10.0	-7.1	29.7	29.7	26.6	0.21
900914	2200	0.91	0.074	0.083	13.56	11.98	-10.0	-12.0	-8.2	27.6	27.9	28.3	0.17
900915	0100	0.88	0.083	0.083	11.98	11.98	-8.0	-6.0	-8.0	29.2	29.2	23.2	0.26
900915	0400	0.82	0.083	0.083	11.98	11.98	-12.0	-10.0	-10.2	27.7	28.2	27.6	0.24
900915	0700	0.76	0.083	0.083	11.98	11.98	-18.0	-14.0	-13.5	30.3	30.8	31.9	0.18
900915	1300	0.79	0.083	0.083	11.98	11.98	-6.0	-8.0	-6.3	28.4	28.5	27.4	0.31
900915	1600	0.74	0.083	0.083	11.98	11.98	-10.0	-12.0	-8.9	27.7	27.6	26.7	0.31
900915	1900	0.73	0.074	0.083	13.56	11.98	-12.0	-10.0	-5.5	27.5	29.5	24.7	0.29
900915	2200	0.72	0.083	0.083	11.98	11.98	-12.0	-12.0	-15.3	29.0	29.7	26.5	0.17
900916	0100	0.74	0.083	0.083	11.98	11.98	-12.0	-10.0	-13.7	32.2	33.3	31.3	0.24
900916	0400	0.71	0.083	0.083	11.98	11.98	-10.0	-8.0	-10.1	30.6	31.8	25.4	0.31
900916	0700	0.66	0.083	0.083	11.98	11.98	-12.0	-10.0	-10.2	24.3	26.8	20.3	0.29
900916	1300	0.75	0.083	0.083	11.98	11.98	-10.0	-10.0	3.1	35.9	26.5	19.5	9.99
900916	1600	0.68	0.083	0.083	11.98	11.98	-12.0	-8.0	-5.9	38.0	44.9	26.8	9.99
900916	1900	0.64	0.083	0.083	11.98	11.98	-12.0	-12.0	-9.5	35.4	42.3	26.7	9.99
900916	2200	0.62	0.083	0.093	11.98	10.72	-14.0	-8.0	-6.1	33.4	34.9	27.2	9.99
900917	0100	1.20	0.201	0.220	4.98	4.54	50.0	58.0	41.0	28.0	15.6	10.5	9.99
900917	0400	1.28	0.191	0.191	5.24	5.24	52.0	54.0	43.9	19.2	12.9	6.8	9.99
900917	0700	1.19	0.191	0.191	5.24	5.24	48.0	48.0	39.6	21.4	14.8	9.5	9.99
900917	1000	1.22	0.181	0.171	5.52	5.83	38.0	38.0	35.0	21.7	14.9	9.1	9.99
900917	1300	1.22	0.171	0.171	5.83	5.83	34.0	38.0	35.7	23.9	17.1	11.8	9.99
900917	1600	1.09	0.171	0.181	5.83	5.52	34.0	44.0	36.0	27.7	17.8	13.4	9.99
900917	1900	0.96	0.191	0.191	5.24	5.24	42.0	42.0	31.1	26.0	16.3	9.5	9.99
900917	2200	1.15	0.181	0.181	5.52	5.52	32.0	32.0	29.9	21.7	15.7	11.1	9.99
900918	0100	1.14	0.171	0.181	5.83	5.52	26.0	26.0	28.5	24.9	19.0	16.2	9.99
900918	0400	1.06	0.171	0.152	5.83	6.59	26.0	26.0	25.0	26.4	20.7	17.6	9.99
900918	0700	0.98	0.142	0.142	7.04	7.04	16.0	18.0	23.8	27.0	21.4	14.0	9.99
900918	1000	1.01	0.142	0.142	7.04	7.04	16.0	14.0	17.2	25.5	20.6	14.5	9.99
900918	1300	0.96	0.152	0.152	6.59	6.59	12.0	12.0	16.9	25.5	21.8	14.7	9.99
900918	1600	0.84	0.171	0.083	5.83	11.98	14.0	14.0	14.3	28.4	25.2	28.1	9.99
900918	1900	0.73	0.162	0.083	6.19	11.98	30.0	18.0	20.7	30.3	22.6	24.0	9.99
900918	2200	0.61	0.083	0.083	11.98	11.98	-12.0	16.0	15.7	34.5	22.8	24.6	9.99
900919	0100	0.55	0.093	0.093	10.72	10.72	-12.0	14.0	10.1	37.7	25.5	23.8	9.99
900919	0400	0.53	0.083	0.093	11.98	10.72	-8.0	14.0	3.4	36.4	28.1	25.7	9.99
900919	0700	0.45	0.083	0.083	11.98	11.98	-10.0	-12.0	3.3	36.2	28.4	28.8	9.99
900919	1000	0.39	0.074	0.083	13.56	11.98	-14.0	-12.0	-3.6	32.9	28.9	29.9	0.21
900919	1300	0.37	0.074	0.074	13.56	13.56	-16.0	-16.0	-10.2	28.8	28.9	17.7	0.16
900919	1600	0.45	0.318	0.074	3.15	13.56	-60.0	-58.0	-31.1	46.5	20.7	24.7	0.27
900919	1900	0.49	0.289	0.074	3.47	13.56	-60.0	-58.0	-38.3	37.0	18.0	20.9	0.25
900919	2200	0.40	0.074	0.074	13.56	13.56	-30.0	-58.0	-39.7	37.2	21.7	19.0	0.23
900920	0100	0.29	0.074	0.074	13.56	13.56	-16.0	-16.0	-32.0	31.7	21.1	21.5	0.17
900920	0400	0.28	0.074	0.074	13.56	13.56	-18.0	-18.0	-28.5	29.3	22.3	20.4	0.38
900920	0700	0.26	0.074	0.074	13.56	13.56	-32.0	-32.0	-31.7	33.1	30.7	26.9	0.39
900920	1000	0.30	0.074	0.074	13.56	13.56	-32.0	-32.0	-11.7	46.5	30.5	23.7	0.36

(Sheet 3 of 37)

Table A1 (Continued)

Date	Time EST	H <sub>m</sub> m	f <sub>p,FD</sub> Hz	f <sub>p,FS</sub> Hz	T <sub>p,FD</sub> sec	T <sub>p,FS</sub> sec	θ <sub>p,FD</sub> deg	θ <sub>p,DS</sub> deg	θ <sub>p,SW</sub> deg	Δθ <sub>DS</sub> deg	Δθ <sub>SW</sub> deg	Δθ <sub>DP</sub> deg	X
900920	1300	0.49	0.259	0.259	3.86	3.86	66.0	64.0	39.0	64.4	22.9	12.8	0.22
900920	1600	0.51	0.269	0.250	3.72	4.01	66.0	68.0	38.1	72.2	29.7	28.4	0.26
900920	1900	0.45	0.074	0.074	13.56	13.56	-30.0	56.0	24.8	75.4	30.1	24.4	0.27
900920	2200	0.47	0.298	0.074	3.35	13.56	48.0	44.0	29.2	55.3	25.5	31.2	0.23
900921	0100	0.57	0.279	0.279	3.59	3.59	56.0	38.0	33.0	36.3	26.4	29.2	0.16
900921	0400	0.56	0.259	0.269	3.86	3.72	50.0	50.0	30.3	41.1	28.2	24.1	0.16
900921	0700	0.51	0.074	0.279	13.56	3.59	-12.0	28.0	23.7	61.8	33.9	31.9	0.21
900921	1000	0.47	0.083	0.083	11.98	11.98	-16.0	28.0	13.0	58.8	35.8	24.2	0.20
900921	1300	0.47	0.123	0.123	8.16	8.16	-38.0	28.0	7.2	59.7	34.9	11.8	0.13
900921	1600	0.59	0.123	0.220	8.16	4.54	-30.0	38.0	16.9	66.5	33.0	24.3	0.13
900921	1900	0.59	0.171	0.181	5.83	5.52	30.0	32.0	13.4	63.3	31.3	20.7	0.16
900921	2200	0.58	0.123	0.298	8.16	3.35	-44.0	-42.0	-7.2	66.4	46.8	61.6	0.14
900922	0100	0.64	0.132	0.289	7.56	3.47	-42.0	-42.0	-34.0	40.5	36.0	28.6	0.15
900922	0400	0.70	0.289	0.269	3.47	3.72	-62.0	-40.0	-45.8	36.5	28.6	24.6	0.20
900922	0700	0.73	0.259	0.259	3.86	3.86	-60.0	-60.0	-47.1	32.6	21.5	16.3	0.26
900922	1000	0.65	0.220	0.220	4.54	4.54	-56.0	-56.0	-44.9	30.7	19.8	11.1	0.20
900922	1300	0.57	0.103	0.113	9.71	8.87	-26.0	-28.0	-39.3	27.1	19.6	15.1	0.14
900922	1600	0.57	0.113	0.113	8.87	8.87	-26.0	-26.0	-38.2	24.5	20.0	17.4	0.15
900922	1900	0.56	0.113	0.113	8.87	8.87	-32.0	-32.0	-40.9	27.4	23.6	19.3	0.20
900922	2200	0.50	0.093	0.093	10.72	10.72	-26.0	-40.0	-40.4	25.5	29.4	17.1	0.21
900923	0100	0.59	0.083	0.093	11.98	10.72	-32.0	-32.0	-10.3	71.1	26.4	22.5	0.16
900923	0400	0.85	0.240	0.250	4.17	4.01	58.0	58.0	26.2	68.7	27.9	24.0	0.15
900923	0700	0.84	0.093	0.220	10.72	4.54	-38.0	46.0	16.5	73.5	28.1	19.2	0.16
900923	1000	0.69	0.093	0.093	10.72	10.72	-28.0	52.0	12.6	76.1	31.4	21.1	0.19
900923	1300	0.61	0.093	0.093	10.72	10.72	-32.0	-30.0	-1.3	62.3	28.5	17.3	0.16
900923	1600	0.63	0.103	0.103	9.71	9.71	-28.0	-20.0	9.5	73.5	21.0	14.5	0.16
900923	1900	0.73	0.259	0.093	3.86	10.72	58.0	58.0	28.3	63.4	20.8	19.7	0.20
900923	2200	0.79	0.279	0.103	3.59	9.71	60.0	58.0	32.9	54.7	19.1	18.4	0.19
900924	0100	0.92	0.191	0.210	5.24	4.75	44.0	48.0	37.3	30.6	15.8	11.7	0.18
900924	0400	0.94	0.191	0.191	5.24	5.24	36.0	36.0	35.3	28.1	16.2	10.7	0.15
900924	0700	0.97	0.191	0.191	5.24	5.24	38.0	38.0	34.9	26.6	16.9	10.6	0.15
900924	1000	0.89	0.171	0.191	5.83	5.24	32.0	40.0	33.6	28.9	18.2	12.3	0.19
900924	1300	0.77	0.181	0.181	5.52	5.52	34.0	42.0	27.4	33.9	18.4	10.0	0.14
900924	1600	0.67	0.191	0.191	5.24	5.24	40.0	40.0	23.1	52.7	19.8	7.8	0.10
900924	1900	0.59	0.191	0.103	5.24	9.71	36.0	36.0	15.9	56.3	24.7	29.5	0.13
900924	2200	0.55	0.103	0.103	9.71	9.71	-20.0	-16.0	9.0	53.9	25.6	21.0	0.17
900925	0100	0.49	0.113	0.113	8.87	8.87	-38.0	-14.0	-8.3	49.9	26.7	21.6	0.15
900925	0400	0.45	0.113	0.103	8.87	9.71	-38.0	-22.0	-13.6	38.1	27.0	23.8	0.14
900925	1300	0.45	0.103	0.103	9.71	9.71	-24.0	-18.0	-24.9	31.9	32.5	34.1	0.21
900925	1600	0.45	0.103	0.103	9.71	9.71	-36.0	-22.0	-28.1	31.6	30.8	29.2	0.14
900925	1900	0.47	0.113	0.103	8.87	9.71	-18.0	-16.0	-31.3	34.8	25.7	33.2	0.17
900925	2200	0.47	0.113	0.113	8.87	8.87	-26.0	-28.0	-30.0	31.5	23.6	25.6	0.23
900926	0100	0.46	0.113	0.113	8.87	8.87	-20.0	-18.0	-26.5	31.5	26.3	31.4	0.20
900926	0400	0.43	0.113	0.113	8.87	8.87	-38.0	-14.0	-26.0	26.8	25.9	26.2	0.14
900926	0700	0.42	0.113	0.113	8.87	8.87	-12.0	-14.0	-22.2	27.8	26.8	23.9	0.18
900926	1000	0.42	0.113	0.113	8.87	8.87	-34.0	-14.0	-26.9	28.7	27.6	25.5	0.26
900926	1300	0.41	0.113	0.113	8.87	8.87	-28.0	-28.0	-23.1	30.2	26.9	23.9	0.27
900926	1600	0.47	0.289	0.113	3.47	8.87	-58.0	-56.0	-31.5	41.4	20.6	29.5	0.18
900926	1900	0.44	0.250	0.093	4.01	10.72	-52.0	-54.0	-31.8	40.0	20.0	27.6	0.18
900926	2200	0.41	0.113	0.093	8.87	10.72	-34.0	-26.0	-24.4	36.2	36.6	33.2	0.24
900927	0100	0.41	0.093	0.093	10.72	10.72	-22.0	-18.0	-25.7	35.4	34.5	30.0	0.25
900927	0400	0.51	0.298	0.103	3.35	9.71	54.0	52.0	5.6	66.9	24.7	24.7	0.18
900927	0700	0.77	0.210	0.230	4.75	4.35	34.0	36.0	27.9	40.9	20.6	15.9	0.14
900927	1000	0.81	0.220	0.230	4.54	4.35	52.0	54.0	32.4	44.3	21.6	16.8	0.19
900927	1300	0.73	0.220	0.230	4.54	4.35	44.0	44.0	30.8	49.8	22.7	16.0	0.19
900927	1600	0.69	0.318	0.230	3.15	4.35	64.0	60.0	25.7	60.3	24.7	16.8	0.17
900927	1900	0.59	0.230	0.113	4.35	8.87	40.0	44.0	13.9	61.6	28.3	34.3	0.12
900927	2200	0.58	0.103	0.113	9.71	8.87	-42.0	-18.0	0.0	52.4	32.1	39.3	0.15

(Sheet 4 of 37)

Table A1 (Continued)

Date	Time EST	H <sub>m</sub> m	f <sub>p,FD</sub> Hz	f <sub>p,FS</sub> Hz	T <sub>p,FD</sub> sec	T <sub>p,FS</sub> sec	θ <sub>p,FD</sub> deg	θ <sub>p,FS</sub> deg	θ <sub>p,SW</sub> deg	Δθ <sub>DS</sub> deg	Δθ <sub>SW</sub> deg	Δθ <sub>DP</sub> deg	X
900928	0100	0.61	0.113	0.113	8.87	8.87	-22.0	10.0	0.2	40.8	32.8	33.5	0.18
900928	0400	0.64	0.113	0.113	8.87	8.87	-24.0	12.0	-2.1	39.0	32.4	35.8	0.13
900928	0700	0.67	0.113	0.113	8.87	8.87	6.0	10.0	5.2	39.9	31.5	36.4	0.11
900928	1000	0.78	0.123	0.113	8.16	8.87	-20.0	8.0	9.2	47.2	33.0	35.7	0.15
900928	1300	0.73	0.113	0.123	8.87	8.16	-22.0	-20.0	-1.9	44.6	32.9	33.7	0.20
900928	1600	0.69	0.093	0.113	10.72	8.87	-20.0	-18.0	-2.8	38.0	31.3	32.8	0.18
900928	1900	0.67	0.083	0.113	11.98	8.87	-16.0	-14.0	-5.3	35.3	32.8	34.8	0.14
900928	2200	0.69	0.083	0.083	11.98	11.98	-20.0	-16.0	-8.7	35.2	34.4	20.6	0.15
900929	0100	0.71	0.083	0.083	11.98	11.98	-16.0	-16.0	-15.6	34.5	34.5	28.2	0.23
900929	0400	0.67	0.093	0.083	10.72	11.98	-16.0	-14.0	-9.7	33.6	32.3	28.8	0.19
900929	0700	0.67	0.093	0.093	10.72	10.72	-20.0	-14.0	-16.4	32.1	31.9	29.0	0.13
900929	1000	0.74	0.083	0.093	11.98	10.72	-22.0	-16.0	-17.2	30.3	30.7	31.8	0.15
900929	1300	0.75	0.083	0.083	11.98	11.98	-18.0	-20.0	-21.2	29.7	29.9	26.1	0.23
900929	1600	0.77	0.083	0.083	11.98	11.98	-20.0	-20.0	-15.4	30.6	30.5	25.0	0.21
900929	1900	0.75	0.083	0.083	11.98	11.98	-10.0	-14.0	-14.4	33.4	33.3	30.7	0.13
900929	2200	0.77	0.083	0.083	11.98	11.98	-18.0	-18.0	-21.3	30.8	31.5	29.0	0.15
900930	0100	0.79	0.083	0.093	11.98	10.72	-16.0	-14.0	-17.1	31.2	31.2	27.9	0.19
900930	0400	0.81	0.093	0.093	10.72	10.72	-18.0	-18.0	-19.9	29.1	29.4	28.9	0.20
900930	0700	0.80	0.103	0.093	9.71	10.72	-22.0	-20.0	-18.9	26.9	26.5	25.2	0.14
900930	1000	0.81	0.083	0.083	11.98	11.98	-18.0	-14.0	-18.8	29.7	29.0	24.9	0.14
900930	1300	0.81	0.083	0.083	11.98	11.98	-20.0	-14.0	-19.7	30.4	29.9	24.6	0.23
900930	1600	0.78	0.083	0.083	11.98	11.98	-14.0	-14.0	-15.1	28.4	28.3	18.5	0.25
900930	1900	0.74	0.103	0.083	9.71	11.98	-32.0	-12.0	-24.3	31.3	31.1	32.2	0.16
900930	2200	0.75	0.093	0.083	10.72	11.98	-20.0	-22.0	-21.9	30.1	29.7	31.1	0.14
901001	0100	0.77	0.103	0.093	9.71	10.72	-24.0	-24.0	-9.6	40.6	29.0	31.8	0.24
901001	0400	1.35	0.220	0.220	4.54	4.54	58.0	58.0	37.2	40.4	20.1	12.1	0.20
901001	0700	1.42	0.181	0.181	5.52	5.52	42.0	42.0	32.6	31.8	18.5	7.9	9.99
901001	1000	1.25	0.162	0.162	6.19	6.19	30.0	30.0	23.9	38.0	20.5	12.5	9.99
901001	1300	1.10	0.074	0.162	13.56	6.19	-12.0	34.0	20.7	40.7	23.7	13.5	9.99
901001	1600	0.98	0.074	0.074	13.56	13.56	-10.0	30.0	18.1	48.6	29.4	25.0	0.18
901001	1900	0.92	0.152	0.083	6.59	11.98	28.0	26.0	16.3	46.3	29.8	28.2	0.12
901001	2200	0.86	0.152	0.083	6.59	11.98	28.0	24.0	9.0	46.8	37.1	30.8	0.09
901002	0100	0.83	0.074	0.083	13.56	11.98	-14.0	-14.0	0.1	45.4	37.6	33.7	0.12
901002	0400	0.77	0.083	0.083	11.98	11.98	-10.0	-12.0	3.3	43.2	37.1	29.4	0.16
901002	0700	0.67	0.083	0.083	11.98	11.98	-12.0	-14.0	-6.2	38.7	35.9	28.5	0.13
901002	1000	0.60	0.083	0.083	11.98	11.98	-10.0	-20.0	-15.5	35.2	35.1	29.1	0.11
901002	1300	0.59	0.083	0.083	11.98	11.98	-18.0	-16.0	-24.5	35.6	36.5	30.4	0.14
901002	1600	0.54	0.083	0.083	11.98	11.98	-14.0	-14.0	-22.5	34.6	35.0	23.0	0.22
901002	1900	0.52	0.083	0.083	11.98	11.98	-16.0	-18.0	-16.4	40.2	32.3	30.4	0.19
901002	2200	0.53	0.103	0.103	9.71	9.71	-20.0	-18.0	-1.9	41.6	28.9	25.0	0.10
901003	0100	0.68	0.210	0.113	4.75	8.87	52.0	52.0	12.6	64.2	27.2	32.4	0.11
901003	0400	0.65	0.210	0.210	4.75	4.75	48.0	42.0	9.8	64.4	30.1	13.5	0.16
901003	0700	0.58	0.230	0.113	4.35	8.87	54.0	-38.0	7.6	64.3	34.0	29.8	0.16
901003	1000	0.52	0.113	0.113	8.87	8.87	-22.0	-26.0	-2.7	51.5	37.1	30.8	0.10
901003	1300	0.52	0.123	0.123	8.16	8.16	-28.0	-26.0	-18.6	42.7	43.9	21.2	0.11
901003	1600	0.56	0.123	0.093	8.16	10.72	-36.0	-38.0	-28.4	38.6	38.9	29.9	0.20
901003	2200	0.58	0.250	0.259	4.01	3.86	-4.0	-24.0	-21.3	34.2	32.3	32.4	0.10
901004	0100	0.59	0.308	0.298	3.25	3.35	-56.0	-56.0	-30.5	41.1	30.4	17.7	0.13
901004	0400	0.60	0.279	0.269	3.59	3.72	-54.0	-54.0	-43.1	38.5	27.8	15.5	0.19
901004	0700	0.56	0.250	0.240	4.01	4.17	-52.0	-52.0	-38.4	37.9	24.7	11.4	0.21
901004	1000	0.55	0.220	0.230	4.54	4.35	-48.0	-48.0	-40.7	31.5	20.6	9.2	0.10
901004	1600	0.74	0.201	0.201	4.98	4.98	-46.0	-50.0	-43.6	16.6	14.7	11.3	0.17
901004	1900	0.60	0.191	0.191	5.24	5.24	-48.0	-34.0	-41.2	21.2	17.9	16.0	0.16
901004	2200	0.53	0.191	0.171	5.24	5.83	-46.0	-46.0	-37.1	21.1	19.0	16.6	0.08
901005	0100	0.46	0.181	0.171	5.52	5.83	-44.0	-28.0	-34.6	21.8	21.8	20.2	0.09
901005	0400	0.61	0.230	0.230	4.35	4.35	56.0	58.0	22.4	89.1	26.9	17.6	0.18
901005	0700	0.59	0.230	0.240	4.35	4.17	64.0	90.0	32.1	86.1	33.9	29.0	0.23
901005	1000	0.49	0.074	0.259	13.56	3.86	-16.0	-16.0	10.7	70.7	37.5	40.8	0.15

(Sheet 5 of 37)

Table A1 (Continued)

Date	Time EST	H <sub>m</sub> m	f <sub>p,FD</sub> Hz	f <sub>p,FS</sub> Hz	T <sub>p,FD</sub> sec	T <sub>p,FS</sub> sec	θ <sub>p,FD</sub> deg	θ <sub>p,FS</sub> deg	θ <sub>p,SW</sub> deg	Δθ <sub>FS</sub> deg	Δθ <sub>SW</sub> deg	Δθ <sub>FD</sub> deg	χ
901005	1300	0.49	0.152	0.074	6.59	13.56	-40.0	-26.0	-2.4	56.7	32.6	23.9	0.10
901005	1600	0.48	0.171	0.162	5.83	6.19	-44.0	-30.0	-10.9	51.1	33.2	18.1	0.15
901005	1900	0.50	0.074	0.074	13.56	13.56	-16.0	-42.0	-15.5	48.4	34.4	23.1	0.22
901005	2200	0.48	0.074	0.074	13.56	13.56	-36.0	-36.0	-24.5	31.3	29.3	18.6	0.13
901006	0100	0.50	0.083	0.083	11.98	11.98	-32.0	-34.0	-32.2	27.1	26.7	18.7	0.10
901006	0400	0.51	0.083	0.083	11.98	11.98	-26.0	-42.0	-31.8	28.5	26.1	20.6	0.17
901006	0700	0.54	0.083	0.083	11.98	11.98	-38.0	-38.0	-38.1	27.6	25.6	20.1	0.32
901006	1000	0.53	0.083	0.083	11.98	11.98	-30.0	-30.0	-31.1	26.7	25.0	19.3	0.19
901006	1300	0.51	0.083	0.083	11.98	11.98	-24.0	-24.0	-28.3	23.8	22.9	19.6	0.09
901006	1600	0.52	0.093	0.093	10.72	10.72	-30.0	-38.0	-30.1	24.8	22.3	19.1	0.15
901006	1900	0.57	0.093	0.093	10.72	10.72	-38.0	-28.0	-34.6	23.2	19.2	16.9	0.24
901006	2200	0.55	0.093	0.093	10.72	10.72	-34.0	-32.0	-34.9	24.4	20.9	19.9	0.17
901007	0100	0.54	0.093	0.093	10.72	10.72	-34.0	-36.0	-34.4	24.0	21.6	22.9	0.08
901007	0400	0.53	0.103	0.103	9.71	9.71	-38.0	-38.0	-37.1	23.5	21.5	17.3	0.12
901007	0700	0.60	0.093	0.093	10.72	10.72	-28.0	-28.0	-36.0	23.4	20.7	14.5	0.26
901007	1000	0.57	0.103	0.093	9.71	10.72	-28.0	-28.0	-32.2	23.6	20.9	21.4	0.22
901007	1300	0.56	0.103	0.103	9.71	9.71	-26.0	-28.0	-33.0	20.8	19.2	15.3	0.09
901007	1600	0.56	0.103	0.103	9.71	9.71	-28.0	-36.0	-35.0	23.1	19.8	18.8	0.13
901007	1900	0.56	0.103	0.103	9.71	9.71	-34.0	-32.0	-33.0	26.5	24.3	20.9	0.20
901007	2200	0.55	0.103	0.103	9.71	9.71	-26.0	-38.0	-32.6	27.3	23.9	24.8	0.19
901008	0100	0.56	0.113	0.103	8.87	9.71	-40.0	-40.0	-35.0	28.0	24.8	26.8	0.10
901008	0400	0.63	0.103	0.103	9.71	9.71	-24.0	-28.0	-33.9	25.6	23.3	25.1	0.12
901008	0700	0.72	0.103	0.093	9.71	10.72	-26.0	-26.0	-33.8	22.5	21.5	19.3	0.23
901008	1000	0.72	0.083	0.093	11.98	10.72	-30.0	-30.0	-33.4	22.5	20.4	24.3	0.24
901008	1300	0.70	0.093	0.093	10.72	10.72	-36.0	-30.0	-33.2	27.3	24.9	27.6	0.12
901008	1600	0.71	0.093	0.093	10.72	10.72	-26.0	-26.0	-27.4	26.9	24.7	30.5	0.11
901008	1900	0.79	0.103	0.103	9.71	9.71	-20.0	-22.0	-28.5	27.4	25.7	25.8	0.16
901008	2200	0.83	0.103	0.103	9.71	9.71	-40.0	-26.0	-33.5	24.5	24.0	24.9	0.20
901009	0100	0.88	0.103	0.103	9.71	9.71	-26.0	-26.0	-28.7	25.4	23.6	21.4	0.12
901009	0400	1.00	0.093	0.093	10.72	10.72	-28.0	-26.0	-31.9	23.5	22.8	21.5	0.10
901009	0700	1.06	0.093	0.093	10.72	10.72	-24.0	-24.0	-27.7	24.6	24.2	29.9	0.15
901009	1000	1.13	0.093	0.093	10.72	10.72	-28.0	-30.0	-36.6	24.7	24.3	30.4	0.19
901009	1300	1.02	0.093	0.093	10.72	10.72	-26.0	-28.0	-35.6	27.1	24.4	23.9	0.14
901009	1600	0.98	0.103	0.093	9.71	10.72	-40.0	-38.0	-38.7	28.3	26.1	31.0	0.11
901009	1900	1.07	0.093	0.093	10.72	10.72	-24.0	-28.0	-35.5	25.4	25.5	27.4	0.12
901009	2200	1.14	0.093	0.093	10.72	10.72	-28.0	-28.0	-32.9	24.1	24.7	23.5	0.15
901010	0100	1.18	0.093	0.093	10.72	10.72	-28.0	-30.0	-32.2	24.2	25.1	23.6	0.13
901010	0400	1.10	0.093	0.093	10.72	10.72	-40.0	-26.0	-34.4	27.7	28.9	30.7	0.11
901010	0700	1.12	0.093	0.093	10.72	10.72	-28.0	-38.0	-31.8	27.9	28.8	30.3	0.12
901010	1000	1.14	0.103	0.103	9.71	9.71	-40.0	-40.0	-36.8	29.1	29.1	30.9	0.19
901010	1300	1.18	0.093	0.093	10.72	10.72	-30.0	-40.0	-35.5	28.6	26.8	27.4	0.17
901010	1600	1.46	0.103	0.103	9.71	9.71	-30.0	-38.0	-36.7	23.6	23.4	16.5	0.14
901010	1900	1.65	0.152	0.142	6.59	7.04	-40.0	-40.0	-38.4	22.1	22.0	19.8	0.14
901010	2200	1.89	0.142	0.123	7.04	8.16	-40.0	-38.0	-41.1	22.2	22.3	23.3	0.17
901011	0100	1.91	0.132	0.132	7.56	7.56	-40.0	-40.0	-40.2	22.1	22.5	22.3	0.17
901011	0400	1.84	0.113	0.123	8.87	8.16	-28.0	-28.0	-37.9	21.8	22.7	18.8	0.15
901011	0700	1.71	0.123	0.123	8.16	8.16	-36.0	-36.0	-38.4	24.2	24.5	24.7	0.14
901011	1000	1.62	0.113	0.113	8.87	8.87	-38.0	-26.0	-37.5	26.8	26.2	25.8	0.16
901011	1300	1.45	0.113	0.113	8.87	8.87	-32.0	-40.0	-37.0	27.7	27.3	24.0	0.16
901011	1600	1.33	0.113	0.103	8.87	9.71	-38.0	-38.0	-36.2	27.2	26.5	20.8	0.13
901011	1900	1.26	0.113	0.113	8.87	8.87	-38.0	-38.0	-33.2	28.5	27.8	28.9	0.10
901011	2200	1.23	0.113	0.113	8.87	8.87	-38.0	-40.0	-33.9	30.5	29.8	28.7	0.11
901012	0100	1.18	0.113	0.113	8.87	8.87	-28.0	-26.0	-32.5	32.7	32.1	23.5	0.13
901012	0400	1.21	0.162	0.113	6.19	8.87	-40.0	-24.0	-29.7	31.9	30.4	26.9	0.13
901012	0700	1.23	0.132	0.113	7.56	8.87	-26.0	-24.0	-25.9	28.8	28.9	30.0	0.11
901012	1000	1.22	0.123	0.123	8.16	8.16	-20.0	-22.0	-27.2	27.8	27.4	20.8	0.16
901012	1300	1.49	0.074	0.064	13.56	15.63	-14.0	-24.0	-25.1	25.0	25.2	20.5	0.21
901012	1600	2.12	0.074	0.074	13.56	13.56	-14.0	-16.0	-17.7	19.6	21.4	17.6	0.17

(Sheet 6 of 37)

**Table A1 (Continued)**

Date	Time EST	H <sub>m</sub> m	f <sub>p,FD</sub> Hz	f <sub>p,FS</sub> Hz	T <sub>p,FD</sub> sec	T <sub>p,FS</sub> sec	θ <sub>p,FD</sub> deg	θ <sub>p,DS</sub> deg	θ <sub>p,SW</sub> deg	Δθ <sub>DS</sub> deg	Δθ <sub>SW</sub> deg	Δθ <sub>FDP</sub> deg	X
901012	1900	2.37	0.074	0.074	13.56	13.56	-14.0	-16.0	-17.2	19.6	21.3	19.8	0.16
901012	2200	2.39	0.074	0.074	13.56	13.56	-16.0	-18.0	-18.7	22.3	23.9	17.8	0.17
901013	0100	2.41	0.083	0.083	11.98	11.98	-26.0	-20.0	-20.7	25.8	27.1	28.6	0.17
901013	0400	2.30	0.083	0.083	11.98	11.98	-30.0	-20.0	-21.3	25.7	26.5	21.8	0.17
901013	0700	2.18	0.083	0.083	11.98	11.98	-24.0	-22.0	-22.8	27.3	27.7	25.3	0.15
901013	1000	2.18	0.093	0.093	10.72	10.72	-20.0	-20.0	-23.9	29.4	30.4	26.0	0.16
901013	1300	2.02	0.083	0.093	11.98	10.72	-38.0	-38.0	-27.9	31.4	30.2	30.5	0.15
901013	1600	1.81	0.093	0.093	10.72	10.72	-20.0	-20.0	-21.8	28.3	28.6	20.7	0.13
901013	1900	1.69	0.093	0.093	10.72	10.72	-14.0	-14.0	-14.8	25.5	26.1	20.1	0.12
901013	2200	1.63	0.093	0.093	10.72	10.72	-16.0	-16.0	-12.1	27.0	27.5	21.9	0.12
901014	0100	1.51	0.093	0.103	10.72	9.71	-18.0	-16.0	-16.1	29.4	29.7	30.5	0.13
901014	0400	1.33	0.103	0.093	9.71	10.72	-10.0	-12.0	-5.9	31.6	31.8	31.0	0.13
901014	0700	1.15	0.103	0.103	9.71	9.71	-8.0	-8.0	1.8	32.4	31.8	31.2	0.12
901014	1000	1.14	0.103	0.103	9.71	9.71	-16.0	4.0	-1.5	31.5	31.4	30.6	0.12
901014	1300	1.11	0.103	0.103	9.71	9.71	-8.0	-12.0	-2.4	30.5	29.0	26.1	0.18
901014	1600	1.12	0.074	0.093	13.56	10.72	-16.0	-16.0	-14.0	31.2	29.8	34.0	0.19
901014	1900	1.34	0.083	0.083	11.98	11.98	-20.0	-18.0	-13.5	26.5	25.4	21.8	0.17
901014	2200	1.18	0.083	0.083	11.98	11.98	-20.0	-20.0	-18.6	24.7	24.1	14.8	0.14
901015	0400	1.07	0.083	0.093	11.98	10.72	-22.0	-20.0	-21.6	27.8	27.4	27.4	0.20
901015	0700	1.00	0.083	0.083	11.98	11.98	-24.0	-22.0	-23.0	31.9	31.2	26.9	0.18
901015	1000	0.96	0.083	0.093	11.98	10.72	-22.0	-20.0	-20.6	25.9	26.4	24.0	0.15
901015	1300	0.99	0.093	0.093	10.72	10.72	-20.0	-22.0	-21.2	27.6	27.3	24.8	0.17
901015	1600	0.96	0.093	0.093	10.72	10.72	-22.0	-22.0	-18.0	27.1	25.0	22.3	0.21
901015	1900	0.84	0.093	0.093	10.72	10.72	-20.0	-22.0	-17.4	32.3	29.4	31.2	0.19
901015	2200	0.78	0.093	0.093	10.72	10.72	-20.0	-22.0	-19.1	32.9	33.8	34.3	0.15
901016	0100	1.18	0.230	0.093	4.35	10.72	48.0	48.0	17.9	54.6	24.1	33.5	0.16
901016	0400	1.58	0.181	0.171	5.52	5.83	36.0	44.0	26.4	39.3	21.3	16.0	0.15
901016	0700	1.31	0.171	0.171	5.83	5.83	40.0	40.0	16.8	45.2	21.4	10.2	0.12
901016	1000	1.10	0.171	0.103	5.83	9.71	38.0	38.0	13.2	47.4	25.3	28.6	0.10
901016	1300	1.13	0.103	0.103	9.71	9.71	-20.0	30.0	11.5	45.5	25.7	27.8	0.10
901016	1600	0.92	0.103	0.103	9.71	9.71	-22.0	-20.0	3.8	46.3	28.1	32.1	0.14
901016	1900	0.84	0.103	0.103	9.71	9.71	-22.0	-22.0	-2.5	45.6	26.9	21.2	0.15
901016	2200	0.78	0.103	0.103	9.71	9.71	-24.0	-12.0	0.7	39.4	32.1	27.7	0.12
901017	0100	0.81	0.103	0.103	9.71	9.71	-16.0	-14.0	-4.2	33.7	32.1	26.1	0.12
901017	0400	0.86	0.103	0.103	9.71	9.71	-18.0	-16.0	-3.4	36.9	33.4	31.3	0.14
901017	0700	0.92	0.103	0.103	9.71	9.71	-12.0	-12.0	0.3	35.5	29.0	24.1	0.13
901017	1000	0.88	0.113	0.103	8.87	9.71	-16.0	-16.0	-3.8	37.7	34.2	24.3	0.12
901017	1300	0.91	0.113	0.103	8.87	9.71	-18.0	-20.0	-27.0	40.4	37.1	25.6	0.14
901017	1600	0.86	0.113	0.103	8.87	9.71	-16.0	-20.0	-31.6	36.9	30.5	22.1	0.19
901017	1900	0.83	0.113	0.113	8.87	8.87	-18.0	-18.0	-32.6	35.0	26.8	19.2	0.18
901017	2200	0.78	0.113	0.113	8.87	8.87	-22.0	-22.0	-34.0	35.3	23.7	19.9	0.14
901018	0100	0.80	0.074	0.113	13.56	8.87	-10.0	-24.0	-31.7	31.9	22.4	21.2	0.17
901018	0400	0.90	0.201	0.201	4.98	4.98	-44.0	-46.0	-36.7	31.8	21.5	12.7	0.19
901018	0700	0.97	0.191	0.191	5.24	5.24	-48.0	-50.0	-38.3	30.9	22.4	18.4	0.17
901018	1000	0.99	0.181	0.181	5.52	5.52	-46.0	-46.0	-39.0	28.2	18.9	18.6	0.14
901018	1300	1.04	0.181	0.171	5.52	5.83	-42.0	-42.0	-35.6	27.0	17.2	19.0	0.17
901018	1600	1.09	0.181	0.162	5.52	6.19	-44.0	-44.0	-37.2	27.3	17.9	18.8	0.21
901018	1900	1.02	0.171	0.171	5.83	5.83	-44.0	-44.0	-38.9	25.2	17.0	15.8	0.20
901018	2200	0.71	0.152	0.064	6.59	15.63	-42.0	-46.0	-33.6	31.8	19.6	20.8	0.16
901019	0100	0.88	0.240	0.240	4.17	4.17	64.0	66.0	34.3	71.9	15.2	5.0	0.22
901019	0400	1.12	0.171	0.171	5.83	5.83	52.0	54.0	43.6	29.0	14.3	6.7	0.22
901019	0700	1.15	0.152	0.152	6.59	6.59	38.0	42.0	34.5	43.7	21.0	21.1	0.17
901019	1000	1.19	0.162	0.132	6.19	7.56	34.0	36.0	31.4	39.3	21.4	34.7	0.16
901019	1300	1.10	0.142	0.142	7.04	7.04	14.0	28.0	24.4	31.9	24.7	18.5	0.11
901019	1600	1.08	0.152	0.152	6.59	6.59	20.0	30.0	29.6	36.5	23.5	13.9	0.14
901019	1900	1.22	0.181	0.181	5.52	5.52	38.0	36.0	33.8	29.1	21.1	14.9	0.13
901019	2200	1.06	0.191	0.171	5.24	5.83	48.0	38.0	31.3	38.7	23.3	14.8	0.12

(Sheet 7 of 37)

Table A1 (Continued)

Date	Time EST	H <sub>m</sub> m	f <sub>p,FD</sub> Hz	f <sub>p,FS</sub> Hz	T <sub>p,FD</sub> sec	T <sub>p,FS</sub> sec	θ <sub>p,FD</sub> deg	θ <sub>p,FS</sub> deg	θ <sub>p,SW</sub> deg	Δθ <sub>DS</sub> deg	Δθ <sub>SW</sub> deg	Δθ <sub>RD</sub> deg	χ
901020	0100	0.98	0.181	0.181	5.52	5.52	42.0	42.0	28.0	46.2	25.2	16.9	0.10
901020	0400	0.99	0.171	0.171	5.83	5.83	36.0	34.0	25.0	50.5	26.8	14.9	0.09
901020	0700	1.00	0.171	0.171	5.83	5.83	34.0	34.0	18.6	50.0	29.1	14.2	0.11
901020	1000	0.98	0.083	0.083	11.98	11.98	-30.0	24.0	16.9	55.0	28.3	24.5	0.12
901020	1300	0.96	0.083	0.083	11.98	11.98	-26.0	-22.0	11.9	53.4	28.6	26.1	0.10
901020	1600	1.07	0.093	0.093	10.72	10.72	-34.0	-22.0	7.0	54.3	31.0	26.1	0.10
901020	1900	1.14	0.093	0.103	10.72	9.71	-16.0	-16.0	6.7	50.6	34.8	25.6	0.11
901020	2200	1.16	0.103	0.103	9.71	9.71	-26.0	-24.0	5.9	50.7	36.1	23.3	0.10
901021	0100	1.22	0.103	0.103	9.71	9.71	-24.0	-26.0	-2.8	48.3	36.9	23.7	0.10
901021	0400	1.21	0.103	0.103	9.71	9.71	-22.0	-20.0	0.9	43.3	36.5	27.2	0.10
901021	0700	1.13	0.103	0.103	9.71	9.71	-20.0	-14.0	4.9	41.7	37.6	25.4	0.13
901021	1000	1.02	0.113	0.113	8.87	8.87	-18.0	-18.0	1.1	37.9	35.2	18.6	0.14
901021	1300	0.94	0.113	0.113	8.87	8.87	-8.0	-10.0	-3.1	36.9	35.9	26.4	0.12
901021	1600	0.93	0.113	0.113	8.87	8.87	-18.0	-12.0	-6.7	37.4	38.1	28.2	0.12
901021	1900	0.92	0.123	0.113	8.16	8.87	-28.0	-28.0	-14.5	39.0	37.6	28.7	0.14
901021	2200	0.88	0.113	0.103	8.87	9.71	-22.0	-22.0	-19.3	38.5	38.1	28.8	0.15
901022	0100	0.86	0.113	0.113	8.87	8.87	-12.0	-12.0	-14.4	34.6	32.5	22.4	0.12
901022	0400	0.83	0.113	0.113	8.87	8.87	-22.0	-22.0	-18.3	34.2	33.8	21.9	0.13
901022	0700	0.80	0.113	0.113	8.87	8.87	-22.0	-40.0	-19.9	36.8	35.4	31.4	0.16
901022	1000	0.75	0.113	0.113	8.87	8.87	-8.0	-18.0	-15.8	32.5	32.3	27.4	0.17
901022	1300	0.72	0.123	0.113	8.16	8.87	-14.0	-16.0	-15.0	31.8	31.5	30.6	0.15
901022	1600	0.73	0.113	0.113	8.87	8.87	-12.0	-14.0	-20.0	31.6	30.6	26.0	0.15
901022	1900	0.77	0.123	0.123	8.16	8.16	-20.0	-18.0	-29.2	35.2	33.2	24.7	0.16
901022	2200	0.77	0.113	0.113	8.87	8.87	-20.0	-20.0	-24.5	34.9	34.9	27.3	0.17
901023	0100	0.74	0.113	0.123	8.87	8.16	-20.0	-20.0	-26.3	36.2	36.1	25.2	0.15
901023	0400	0.77	0.113	0.113	8.87	8.87	-18.0	-18.0	-27.9	37.6	33.3	29.0	0.13
901023	0700	0.90	0.181	0.181	5.52	5.52	-50.0	-36.0	-37.3	38.0	30.0	19.1	0.14
901023	1000	1.20	0.181	0.171	5.52	5.83	-48.0	-38.0	-44.9	33.1	27.3	29.4	0.16
901023	1300	1.45	0.123	0.123	8.16	8.16	-28.0	-28.0	-39.2	20.1	19.7	13.0	0.12
901023	1600	1.43	0.123	0.113	8.16	8.87	-38.0	-28.0	-34.7	23.0	23.3	26.4	0.12
901023	1900	1.19	0.113	0.113	8.87	8.87	-24.0	-26.0	-33.7	27.8	25.8	24.0	0.13
901023	2200	0.97	0.103	0.113	9.71	8.87	-40.0	-28.0	-38.7	33.9	32.6	38.9	0.19
901024	0100	0.85	0.113	0.113	8.87	8.87	-20.0	-42.0	-31.7	36.4	36.0	34.6	0.16
901024	0400	0.89	0.123	0.113	8.16	8.87	-36.0	-38.0	-33.5	32.8	34.1	33.6	0.13
901024	0700	0.92	0.123	0.113	8.16	8.87	-28.0	-40.0	0.2	67.3	37.6	32.5	0.14
901024	1000	0.88	0.123	0.123	8.16	8.16	-42.0	-32.0	6.5	77.3	32.2	19.0	0.16
901024	1300	0.83	0.132	0.123	7.56	8.16	-42.0	-42.0	-9.2	58.3	30.0	22.0	0.16
901024	1600	0.81	0.132	0.123	7.56	8.16	-40.0	-40.0	-12.4	43.9	28.8	23.1	0.14
901024	1900	0.86	0.123	0.123	8.16	8.16	-40.0	-40.0	-20.6	37.3	32.6	27.2	0.15
901024	2200	0.78	0.123	0.123	8.16	8.16	-40.0	-42.0	-22.6	40.9	37.5	37.8	0.19
901025	0100	0.71	0.123	0.123	8.16	8.16	-40.0	-40.0	-18.3	41.6	36.5	30.5	0.18
901025	0400	0.74	0.123	0.123	8.16	8.16	-40.0	-42.0	-11.3	48.0	35.6	30.8	0.16
901025	0700	0.97	0.142	0.250	7.04	4.01	-42.0	16.0	1.5	46.6	29.6	23.6	0.13
901025	1000	1.16	0.220	0.220	4.54	4.54	26.0	26.0	15.8	43.4	31.3	24.3	0.12
901025	1300	1.45	0.191	0.191	5.24	5.24	34.0	34.0	29.1	33.1	27.9	15.5	0.10
901025	1600	2.10	0.162	0.162	6.19	6.19	36.0	38.0	34.7	26.6	25.7	16.7	0.14
901025	1900	2.74	0.142	0.142	7.04	7.04	28.0	24.0	27.9	25.2	24.2	14.7	0.19
901025	2200	3.67	0.132	0.132	7.56	7.56	16.0	18.0	28.9	25.6	24.6	20.7	0.23
901026	0100	3.87	0.123	0.123	8.16	8.16	14.0	42.0	26.9	28.3	26.5	24.8	0.22
901026	0400	4.37	0.123	0.123	8.16	8.16	34.0	38.0	29.9	25.6	24.0	23.7	0.26
901026	0700	4.49	0.103	0.103	9.71	9.71	22.0	38.0	21.0	26.7	24.5	22.9	0.25
901026	1000	4.06	0.093	0.093	10.72	10.72	18.0	18.0	23.1	26.3	24.1	21.0	0.21
901026	1300	3.50	0.083	0.083	11.98	11.98	-2.0	14.0	17.6	28.1	23.5	17.0	0.20
901026	1600	3.04	0.083	0.083	11.98	11.98	2.0	8.0	18.2	27.2	23.4	16.8	0.18
901026	1900	2.89	0.083	0.083	11.98	11.98	14.0	8.0	17.5	24.4	23.4	18.2	0.18
901026	2200	2.81	0.083	0.083	11.98	11.98	0.0	2.0	16.2	25.3	22.4	16.3	0.17
901027	0100	2.56	0.083	0.083	11.98	11.98	2.0	10.0	19.6	26.7	23.5	19.6	0.17
901027	0400	2.31	0.083	0.083	11.98	11.98	8.0	8.0	19.5	24.6	21.2	15.9	0.16

(Sheet 8 of 37)

Table A1 (Continued)

Date	Time EST	$H_{ms}$ m	$f_{p,FD}$ Hz	$f_{p,FS}$ Hz	$T_{p,FD}$ sec	$T_{p,FS}$ sec	$\theta_{p,FD}$ deg	$\theta_{p,DS}$ deg	$\theta_{p,SW}$ deg	$\Delta\theta_{DS}$ deg	$\Delta\theta_{SW}$ deg	$\Delta\theta_{DDP}$ deg	$\chi$
901028	1000	0.83	0.093	0.093	10.72	10.72	-2.0	0.0	3.6	30.2	30.2	23.1	0.19
901028	1300	0.72	0.083	0.093	11.98	10.72	14.0	14.0	0.4	31.9	31.3	28.3	0.30
901028	1600	0.68	0.093	0.083	10.72	11.98	16.0	16.0	2.2	33.0	31.3	30.0	0.28
901028	1900	0.70	0.103	0.083	9.71	11.98	16.0	16.0	7.5	29.8	30.8	26.0	0.17
901028	2200	1.18	0.093	0.093	10.72	10.72	16.0	60.0	43.2	52.6	25.9	27.4	0.17
901029	0100	1.46	0.181	0.181	5.52	5.52	44.0	46.0	41.7	31.0	20.3	13.3	0.18
901029	0400	1.39	0.162	0.171	6.19	5.83	38.0	36.0	38.0	26.4	17.5	13.6	0.20
901029	0700	1.46	0.152	0.152	6.59	6.59	34.0	34.0	35.2	23.6	17.0	12.7	0.16
901029	1000	1.39	0.152	0.152	6.59	6.59	26.0	30.0	33.1	25.0	17.8	11.4	0.16
901029	1600	1.25	0.142	0.142	7.04	7.04	28.0	30.0	29.4	25.8	19.5	14.1	0.17
901029	1900	1.29	0.152	0.152	6.59	6.59	22.0	26.0	25.4	28.6	20.1	16.8	0.15
901029	2200	1.46	0.152	0.152	6.59	6.59	28.0	26.0	26.1	28.3	20.5	11.6	0.13
901030	0100	1.45	0.103	0.171	9.71	5.83	-14.0	28.0	25.7	32.4	22.8	17.7	0.14
901030	0400	1.36	0.103	0.103	9.71	9.71	-16.0	28.0	20.7	40.9	22.8	14.3	0.15
901030	0700	1.18	0.103	0.074	9.71	13.56	-16.0	24.0	16.8	41.3	23.5	22.2	0.15
901030	1000	1.16	0.074	0.074	13.56	13.56	-6.0	20.0	15.5	38.0	24.6	18.3	0.15
901030	1600	0.92	0.074	0.074	13.56	13.56	-10.0	22.0	13.7	36.2	23.8	24.5	0.20
901030	1900	0.83	0.074	0.074	13.56	13.56	-8.0	16.0	9.9	33.9	24.1	25.7	0.22
901030	2200	0.79	0.074	0.083	13.56	11.98	-8.0	6.0	6.5	27.4	23.5	23.8	0.20
901031	0100	0.72	0.083	0.083	11.98	11.98	-4.0	-4.0	1.2	27.6	25.8	23.4	0.21
901031	0400	0.71	0.074	0.083	13.56	11.98	-10.0	-10.0	-4.4	28.4	28.0	28.6	0.22
901031	0700	0.63	0.074	0.083	13.56	11.98	-10.0	-10.0	-3.7	25.0	24.8	23.7	0.21
901031	1000	0.63	0.103	0.103	9.71	9.71	2.0	2.0	-4.0	24.3	23.6	17.5	0.24
901031	1300	0.57	0.103	0.103	9.71	9.71	16.0	0.0	1.5	25.8	23.9	21.1	0.26
901031	1600	0.60	0.093	0.093	10.72	10.72	12.0	0.0	6.2	27.4	27.1	23.9	0.30
901031	1900	0.60	0.093	0.093	10.72	10.72	-14.0	-14.0	-3.9	26.9	27.1	27.0	0.23
901031	2200	0.66	0.103	0.093	9.71	10.72	-12.0	-10.0	-8.0	25.5	26.0	25.3	0.17
901101	0100	0.66	0.093	0.103	10.72	9.71	-6.0	-8.0	-4.0	24.4	25.0	22.9	0.20
901101	0400	0.59	0.093	0.093	10.72	10.72	-10.0	2.0	-4.6	27.7	28.2	28.5	0.21
901101	0700	0.56	0.093	0.093	10.72	10.72	-2.0	-2.0	-2.2	28.2	27.4	26.2	0.27
901101	1300	0.59	0.093	0.093	10.72	10.72	-8.0	6.0	2.4	27.7	26.7	23.5	0.21
901101	1600	0.60	0.093	0.093	10.72	10.72	-12.0	-12.0	-4.5	29.4	27.0	25.5	0.23
901101	1900	0.56	0.093	0.093	10.72	10.72	-10.0	-10.0	3.3	28.7	28.8	25.3	0.20
901101	2200	0.53	0.093	0.093	10.72	10.72	-8.0	-8.0	-2.3	26.1	26.7	20.2	0.16
901102	0100	0.51	0.093	0.103	10.72	9.71	-12.0	-10.0	-3.1	28.4	28.7	24.9	0.19
901102	0400	0.46	0.093	0.103	10.72	9.71	-6.0	-10.0	-1.7	28.2	28.5	23.7	0.20
901102	1000	0.39	0.093	0.103	10.72	9.71	-6.0	-8.0	-9.6	30.3	29.4	25.2	0.21
901102	1300	0.43	0.123	0.113	8.16	8.87	-10.0	-12.0	-10.7	27.1	25.8	22.4	0.23
901102	1600	0.45	0.123	0.123	8.16	8.16	2.0	0.0	-6.8	28.1	27.3	24.3	0.23
901102	1900	0.45	0.123	0.123	8.16	8.16	2.0	-12.0	-12.8	31.0	29.1	24.1	0.22
901102	2200	0.41	0.123	0.123	8.16	8.16	-10.0	-12.0	-18.3	29.6	28.8	24.1	0.24
901103	0100	0.39	0.123	0.123	8.16	8.16	-16.0	-22.0	-15.4	29.7	26.8	24.4	0.22
901103	0400	0.38	0.074	0.074	13.56	13.56	-10.0	-16.0	-21.4	30.7	25.9	25.4	0.31
901103	0700	0.35	0.074	0.074	13.56	13.56	-10.0	-14.0	-23.0	35.5	26.4	29.3	0.26
901103	1000	0.33	0.074	0.074	13.56	13.56	-10.0	-12.0	-19.7	33.5	27.9	29.3	0.28
901103	1300	0.34	0.074	0.074	13.56	13.56	-14.0	-14.0	-27.2	29.6	23.8	23.5	0.24
901103	1600	0.38	0.074	0.074	13.56	13.56	-10.0	-40.0	-31.5	32.6	22.0	19.0	0.25
901103	1900	0.39	0.142	0.074	7.04	13.56	-42.0	-44.0	-35.2	30.5	20.4	22.9	0.23
901103	2200	0.37	0.074	0.083	13.56	11.98	-10.0	-42.0	-32.8	31.0	20.8	29.2	0.24
901104	0100	0.42	0.103	0.103	9.71	9.71	-30.0	-30.0	-32.0	22.2	17.0	11.5	0.19
901104	0400	0.46	0.103	0.103	9.71	9.71	-34.0	-34.0	-35.7	17.5	15.8	9.9	0.21
901104	0700	0.47	0.113	0.113	8.87	8.87	-36.0	-38.0	-36.3	17.2	16.3	9.6	0.21
901104	1000	0.46	0.113	0.113	8.87	8.87	-36.0	-38.0	-34.4	18.2	17.2	11.8	0.21
901104	1300	0.51	0.103	0.113	9.71	8.87	-34.0	-30.0	-34.4	15.7	16.1	13.1	0.16
901104	1600	0.59	0.123	0.113	8.16	8.87	-36.0	-38.0	-36.4	16.0	16.2	15.1	0.18
901104	1900	0.62	0.103	0.103	9.71	9.71	-32.0	-32.0	-36.0	16.3	15.9	11.9	0.20
901104	2200	0.58	0.103	0.103	9.71	9.71	-32.0	-32.0	-34.3	17.7	17.6	15.6	0.19

(Sheet 9 of 37)

Table A1 (Continued)

Date	Time EST	H <sub>m</sub> m	f <sub>p,FD</sub> Hz	f <sub>p,FS</sub> Hz	T <sub>p,FD</sub> sec	T <sub>p,FS</sub> sec	θ <sub>p,FD</sub> deg	θ <sub>p,FS</sub> deg	θ <sub>p,SW</sub> deg	Δθ <sub>DS</sub> deg	Δθ <sub>SW</sub> deg	Δθ <sub>DP</sub> deg	x
901105	0100	0.59	0.103	0.103	9.71	9.71	-38.0	-30.0	-33.0	18.4	18.8	19.3	0.17
901105	0400	0.74	0.103	0.103	9.71	9.71	-32.0	-30.0	-33.2	17.8	19.8	16.7	0.17
901105	0700	0.84	0.093	0.093	10.72	10.72	-32.0	-32.0	-35.9	17.4	17.6	12.3	0.22
901105	1000	0.93	0.093	0.093	10.72	10.72	-30.0	-30.0	-31.6	16.9	17.3	14.2	0.19
901105	1300	0.89	0.093	0.093	10.72	10.72	-28.0	-30.0	-32.3	15.3	15.7	14.1	0.18
901105	1600	0.88	0.093	0.093	10.72	10.72	-30.0	-30.0	-35.0	15.9	15.3	11.5	0.18
901105	1900	0.86	0.103	0.103	9.71	9.71	-30.0	-30.0	-35.5	17.8	16.4	14.9	0.18
901105	2200	0.83	0.103	0.103	9.71	9.71	-30.0	-30.0	-38.7	22.2	18.7	19.1	0.16
901106	0100	0.84	0.103	0.103	9.71	9.71	-32.0	-28.0	-38.6	19.3	19.8	18.5	0.13
901106	0400	1.01	0.113	0.113	8.87	8.87	-24.0	-28.0	-32.5	19.2	18.9	15.8	0.14
901106	1000	0.71	0.103	0.103	9.71	9.71	-26.0	-26.0	-8.2	53.8	24.4	17.3	0.17
901106	1300	0.88	0.103	0.103	9.71	9.71	-26.0	-48.0	20.7	76.8	18.9	17.4	0.15
901106	1600	0.82	0.113	0.103	8.87	9.71	-26.0	56.0	16.7	75.1	22.0	20.7	0.13
901106	1900	0.93	0.113	0.113	8.87	8.87	-26.0	40.0	27.1	64.8	23.5	17.1	0.12
901106	2200	0.99	0.113	0.201	8.87	4.98	-24.0	38.0	32.3	37.4	21.5	14.3	0.13
901107	0100	1.11	0.191	0.191	5.24	5.24	34.0	32.0	25.9	27.5	22.5	12.1	0.11
901107	0400	1.02	0.181	0.181	5.52	5.52	26.0	28.0	23.6	34.4	25.2	17.1	0.10
901107	0700	0.96	0.181	0.181	5.52	5.52	30.0	30.0	21.0	44.5	27.8	18.2	0.12
901107	1000	0.87	0.171	0.171	5.83	5.83	32.0	32.0	15.4	51.6	29.4	10.8	0.13
901107	1300	0.75	0.162	0.162	6.19	6.19	32.0	32.0	23.3	47.0	28.3	17.0	0.14
901107	1600	0.68	0.171	0.171	5.83	5.83	32.0	30.0	14.2	51.1	29.6	13.5	0.11
901107	1900	0.65	0.123	0.123	8.16	8.16	-24.0	24.0	9.0	52.6	33.3	21.4	0.14
901107	2200	0.61	0.123	0.132	8.16	7.56	-42.0	-22.0	-1.7	54.7	34.8	29.6	0.17
901108	0100	0.62	0.318	0.132	3.15	7.56	60.0	32.0	8.5	61.6	27.1	26.2	0.17
901108	0400	1.57	0.181	0.181	5.52	5.52	34.0	44.0	41.0	19.0	18.1	12.1	0.17
901108	0700	1.91	0.162	0.162	6.19	6.19	40.0	40.0	40.9	19.1	17.2	9.3	0.20
901108	1000	2.03	0.142	0.142	7.04	7.04	26.0	26.0	38.6	22.4	17.4	11.3	0.22
901108	1300	1.64	0.132	0.132	7.56	7.56	22.0	30.0	37.3	24.2	18.2	12.8	0.19
901108	1600	1.37	0.142	0.142	7.04	7.04	22.0	34.0	33.7	24.5	18.0	13.4	0.16
901108	1900	1.18	0.162	0.162	6.19	6.19	24.0	30.0	32.3	25.7	20.6	14.5	0.14
901108	2200	1.10	0.181	0.201	5.52	4.98	32.0	30.0	31.4	29.5	23.0	20.8	0.14
901109	0100	1.02	0.152	0.152	6.59	6.59	28.0	30.0	27.9	28.0	24.1	14.6	0.14
901109	0400	0.89	0.162	0.162	6.19	6.19	24.0	24.0	26.3	30.4	25.4	16.1	0.13
901109	0700	0.77	0.171	0.171	5.83	5.83	24.0	24.0	25.4	35.3	28.7	14.9	0.12
901109	1000	0.80	0.162	0.162	6.19	6.19	22.0	24.0	20.1	37.3	31.2	17.2	0.13
901109	1300	0.88	0.142	0.240	7.04	4.17	14.0	14.0	12.2	40.8	38.9	53.5	0.13
901109	1600	1.01	0.210	0.220	4.75	4.54	28.0	10.0	3.1	35.8	34.9	32.5	0.12
901109	1900	0.96	0.191	0.191	5.24	5.24	32.0	14.0	13.5	36.9	35.3	32.7	0.13
901109	2200	1.38	0.191	0.191	5.24	5.24	-44.0	-40.0	-39.1	45.9	42.7	39.4	0.15
901110	0100	1.85	0.152	0.152	6.59	6.59	-38.0	-40.0	-40.2	29.1	27.3	16.7	0.18
901110	0400	2.32	0.113	0.123	8.87	8.16	-38.0	-40.0	-43.1	23.5	24.4	21.5	0.20
901110	0700	2.74	0.103	0.103	9.71	9.71	-28.0	-26.0	-31.6	19.1	20.5	14.4	0.24
901110	1000	2.03	0.103	0.103	9.71	9.71	-28.0	-28.0	-31.1	22.2	22.9	20.3	0.15
901110	1300	1.48	0.103	0.103	9.71	9.71	-24.0	-40.0	-35.8	29.4	29.1	27.0	0.16
901110	1600	1.19	0.093	0.093	10.72	10.72	-36.0	-36.0	-34.0	32.0	32.2	36.3	0.15
901110	1900	1.27	0.093	0.093	10.72	10.72	-40.0	-40.0	-3.2	74.6	25.4	26.5	0.13
901110	2200	1.23	0.093	0.093	10.72	10.72	-28.0	46.0	11.3	71.8	20.4	23.0	0.13
901111	0100	1.12	0.162	0.093	6.19	10.72	40.0	40.0	14.1	70.0	18.9	22.3	0.17
901111	0400	0.94	0.093	0.093	10.72	10.72	-42.0	48.0	10.8	68.0	22.7	30.3	0.18
901111	0700	0.91	0.250	0.093	4.01	10.72	54.0	54.0	18.0	54.9	18.1	28.7	0.16
901111	1000	0.85	0.152	0.103	6.59	9.71	22.0	56.0	20.3	54.2	18.7	33.8	0.18
901111	1300	0.78	0.162	0.103	6.19	9.71	30.0	30.0	20.1	52.2	20.3	36.6	0.19
901111	1600	0.66	0.220	0.103	4.54	9.71	60.0	30.0	21.2	63.1	23.9	37.4	0.18
901111	1900	0.53	0.103	0.103	9.71	9.71	-38.0	12.0	2.4	51.4	29.5	34.2	0.19
901111	2200	0.40	0.103	0.103	9.71	9.71	-32.0	12.0	2.6	39.4	35.0	33.7	0.24
901112	0100	0.29	0.113	0.113	8.87	8.87	-32.0	-32.0	-22.9	32.5	26.9	16.1	0.31
901112	0400	0.23	0.103	0.103	9.71	9.71	-18.0	-16.0	-22.7	34.7	30.0	21.2	0.30
901112	0700	0.25	0.083	0.083	11.98	11.98	-4.0	-8.0	-7.3	40.3	36.9	21.4	0.25

(Sheet 10 of 37)

Table A1 (Continued)

Date	Time EST	H <sub>m</sub> m	f <sub>p,FD</sub> Hz	f <sub>p,FS</sub> Hz	T <sub>p,FD</sub> sec	T <sub>p,FS</sub> sec	θ <sub>p,FD</sub> deg	θ <sub>p,DS</sub> deg	θ <sub>p,SW</sub> deg	Δθ <sub>DS</sub> deg	Δθ <sub>SW</sub> deg	Δθ <sub>DP</sub> deg	x
901112	1000	0.39	0.142	0.152	7.04	6.59	-42.0	-40.0	25.7	85.1	26.0	18.4	0.19
901112	1300	0.47	0.113	0.113	8.87	8.87	16.0	90.0	34.6	58.6	38.4	22.6	0.18
901112	1600	0.72	0.132	0.132	7.56	7.56	10.0	14.0	35.2	34.0	29.9	14.0	0.20
901112	1900	0.68	0.142	0.142	7.04	7.04	16.0	16.0	33.2	32.0	28.0	15.6	0.18
901112	2200	0.76	0.123	0.123	8.16	8.16	10.0	12.0	17.9	24.7	23.4	18.4	0.16
901113	0100	1.14	0.132	0.132	7.56	7.56	12.0	14.0	40.0	36.0	24.5	15.0	0.17
901113	0400	1.25	0.142	0.142	7.04	7.04	20.0	20.0	30.3	26.0	24.2	13.9	0.19
901113	0700	1.13	0.132	0.152	7.56	6.59	12.0	22.0	29.5	23.8	20.5	14.6	0.17
901113	1600	1.12	0.152	0.142	6.59	7.04	28.0	28.0	33.9	22.5	18.8	15.1	0.20
901113	1900	0.99	0.152	0.152	6.59	6.59	28.0	28.0	36.5	23.8	16.9	8.6	0.17
901113	2200	1.04	0.123	0.162	8.16	6.19	12.0	36.0	32.7	24.7	16.2	11.6	0.15
901114	0100	1.44	0.152	0.152	6.59	6.59	24.0	32.0	33.3	25.3	18.5	14.7	0.18
901114	0400	1.47	0.152	0.142	6.59	7.04	30.0	30.0	35.5	28.5	17.8	13.0	0.20
901114	0700	1.53	0.142	0.142	7.04	7.04	26.0	26.0	34.2	26.7	19.1	14.9	0.18
901114	1000	1.45	0.132	0.162	7.56	6.19	14.0	32.0	31.9	28.5	20.3	15.9	0.16
901114	1300	1.40	0.132	0.132	7.56	7.56	24.0	14.0	26.6	28.0	23.7	14.1	0.14
901114	1600	1.22	0.142	0.132	7.04	7.56	24.0	24.0	24.2	26.8	22.9	17.1	0.18
901114	1900	1.00	0.113	0.113	8.87	8.87	8.0	18.0	23.6	25.7	21.5	16.0	0.19
901114	2200	0.90	0.132	0.132	7.56	7.56	12.0	12.0	18.9	23.4	19.4	14.1	0.17
901115	0100	0.79	0.132	0.132	7.56	7.56	18.0	18.0	19.7	25.1	21.4	15.7	0.21
901115	0400	0.69	0.162	0.162	6.19	6.19	20.0	20.0	19.8	28.6	21.7	15.9	0.23
901115	0700	0.57	0.152	0.142	6.59	7.04	16.0	16.0	12.6	31.8	23.2	27.1	0.24
901115	1000	0.50	0.103	0.103	9.71	9.71	0.0	-8.0	9.2	29.8	24.1	18.1	0.21
901115	1300	0.47	0.152	0.113	6.59	8.87	10.0	12.0	4.0	30.3	28.5	22.2	0.19
901115	1600	0.44	0.113	0.113	8.87	8.87	-12.0	-12.0	-6.4	28.6	28.5	21.2	0.19
901115	1900	0.37	0.113	0.113	8.87	8.87	8.0	-12.0	-6.5	27.6	27.5	22.4	0.21
901115	2200	0.34	0.123	0.123	8.16	8.16	-14.0	-14.0	-16.1	25.4	24.6	19.6	0.24
901116	0100	0.32	0.123	0.132	8.16	7.56	-14.0	-14.0	-19.0	24.4	22.5	19.1	0.25
901116	0400	0.29	0.113	0.123	8.87	8.16	-12.0	-14.0	-18.6	25.6	22.6	19.5	0.29
901116	0700	0.26	0.113	0.113	8.87	8.87	-10.0	-12.0	-15.2	26.0	25.4	23.5	0.27
901116	1000	0.25	0.103	0.113	9.71	8.87	-14.0	-14.0	-15.4	23.4	24.8	19.9	0.28
901116	1300	0.24	0.132	0.113	7.56	8.87	-10.0	-10.0	-16.0	22.4	21.9	22.3	0.30
901116	1600	0.22	0.113	0.123	8.87	8.16	-34.0	-14.0	-25.1	26.5	24.3	25.1	0.37
901116	1900	0.26	0.318	0.318	3.15	3.15	-56.0	-56.0	-34.0	38.6	19.5	6.5	0.26
901116	2200	0.21	0.103	0.064	9.71	15.63	-34.0	-34.0	-32.5	32.4	21.4	29.7	0.29
901117	0100	0.21	0.113	0.064	8.87	15.63	-32.0	-30.0	-28.3	28.8	21.3	21.2	0.36
901117	0400	0.21	0.113	0.064	8.87	15.63	-36.0	-38.0	-30.7	32.2	23.1	23.1	0.43
901117	1300	1.20	0.171	0.171	5.83	5.83	44.0	48.0	46.1	15.0	12.4	9.4	0.19
901117	1600	1.33	0.171	0.171	5.83	5.83	38.0	40.0	42.6	16.5	13.1	7.8	0.21
901117	1900	1.65	0.162	0.152	6.19	6.59	32.0	40.0	39.2	17.3	14.2	12.0	0.22
901117	2200	2.27	0.142	0.142	7.04	7.04	24.0	28.0	34.3	20.7	17.0	14.1	0.23
901118	0100	2.33	0.142	0.142	7.04	7.04	32.0	32.0	33.9	24.1	19.4	13.8	0.23
901118	0400	2.21	0.152	0.142	6.59	7.04	26.0	48.0	35.5	25.0	18.7	17.7	0.23
901118	0700	2.27	0.132	0.132	7.56	7.56	22.0	50.0	34.2	28.3	19.3	17.5	0.25
901118	1000	2.25	0.142	0.152	7.04	6.59	22.0	48.0	33.1	28.5	18.8	17.9	0.23
901118	1300	2.00	0.142	0.162	7.04	6.19	24.0	24.0	28.6	30.2	19.6	15.8	0.21
901118	1600	1.90	0.103	0.103	9.71	9.71	8.0	20.0	25.4	30.3	21.8	17.2	0.19
901118	1900	1.89	0.142	0.103	7.04	9.71	18.0	16.0	24.3	28.3	20.7	19.0	0.20
901118	2200	1.87	0.103	0.103	9.71	9.71	6.0	10.0	23.3	28.7	22.3	21.5	0.17
901119	0100	1.96	0.093	0.093	10.72	10.72	-2.0	0.0	14.8	28.1	23.3	21.2	0.15
901119	0400	1.98	0.083	0.093	11.98	10.72	-12.0	6.0	12.4	28.9	25.1	27.1	0.15
901119	0700	1.99	0.083	0.083	11.98	11.98	-8.0	6.0	7.4	24.9	22.5	24.5	0.18
901119	1000	2.01	0.083	0.083	11.98	11.98	-6.0	-6.0	5.4	26.0	23.9	24.1	0.16
901119	1300	2.07	0.083	0.083	11.98	11.98	0.0	2.0	1.0	21.6	21.1	19.9	0.15
901119	1600	1.90	0.083	0.083	11.98	11.98	0.0	0.0	1.0	22.3	20.8	19.3	0.16
901119	1900	1.61	0.083	0.083	11.98	11.98	-4.0	2.0	1.4	22.1	21.5	22.1	0.18
901119	2200	1.46	0.083	0.083	11.98	11.98	-2.0	0.0	0.8	22.0	21.2	21.4	0.20

(Sheet 11 of 37)

Table A1 (Continued)

Date	Time EST	H <sub>m</sub> m	f <sub>p,FD</sub> Hz	f <sub>p,FS</sub> Hz	T <sub>p,FD</sub> sec	T <sub>p,FS</sub> sec	θ <sub>p,FD</sub> deg	θ <sub>p,DS</sub> deg	θ <sub>p,SW</sub> deg	Δθ <sub>DS</sub> deg	Δθ <sub>SW</sub> deg	Δθ <sub>DP</sub> deg	x
901120	0100	1.27	0.083	0.083	11.98	11.98	14.0	0.0	7.0	21.4	21.3	22.5	0.17
901120	0400	1.22	0.093	0.093	10.72	10.72	2.0	0.0	1.0	22.1	21.9	20.7	0.18
901120	0700	1.13	0.083	0.083	11.98	11.98	-6.0	0.0	2.9	23.6	23.1	22.0	0.22
901120	1000	1.04	0.093	0.093	10.72	10.72	0.0	0.0	3.4	25.4	22.9	22.5	0.22
901120	1300	1.05	0.093	0.093	10.72	10.72	-2.0	0.0	10.0	33.3	24.2	24.5	0.16
901120	1600	1.07	0.093	0.093	10.72	10.72	-4.0	18.0	14.2	33.6	23.1	25.2	0.14
901120	1900	1.08	0.103	0.093	9.71	10.72	-4.0	24.0	12.5	31.9	20.8	25.9	0.15
901120	2200	1.14	0.093	0.093	10.72	10.72	-12.0	30.0	17.7	34.6	19.5	21.7	0.15
901121	0100	1.27	0.162	0.171	6.19	5.83	20.0	30.0	20.2	33.7	20.5	17.0	0.13
901121	0400	1.23	0.171	0.171	5.83	5.83	26.0	22.0	19.2	35.2	23.6	16.3	0.12
901121	0700	1.16	0.162	0.162	6.19	6.19	24.0	24.0	19.9	32.4	24.0	14.6	0.16
901121	1000	1.06	0.142	0.162	7.04	6.19	12.0	14.0	18.1	31.6	23.6	19.9	0.16
901121	1300	1.09	0.152	0.132	6.59	7.56	14.0	16.0	16.6	30.0	23.3	19.9	0.15
901121	1600	1.02	0.152	0.152	6.59	6.59	22.0	22.0	15.1	30.5	24.6	21.4	0.14
901121	1900	0.90	0.171	0.113	5.83	8.87	22.0	22.0	13.6	32.2	24.8	22.9	0.17
901121	2200	0.78	0.162	0.103	6.19	9.71	22.0	22.0	12.4	30.8	24.4	25.5	0.18
901122	0100	0.71	0.162	0.103	6.19	9.71	24.0	12.0	15.9	33.4	27.7	31.7	0.17
901122	0400	0.68	0.162	0.113	6.19	8.87	24.0	14.0	7.6	37.1	30.0	29.6	0.17
901122	0700	0.67	0.113	0.113	8.87	8.87	-18.0	8.0	3.9	37.8	31.3	25.4	0.19
901122	1000	0.62	0.123	0.113	8.16	8.87	-12.0	-10.0	6.1	35.7	32.5	25.3	0.19
901122	1300	0.58	0.113	0.113	8.87	8.87	-6.0	-14.0	5.2	33.0	32.6	24.8	0.18
901122	1600	0.56	0.123	0.123	8.16	8.16	-10.0	-12.0	-2.2	29.8	29.8	18.3	0.17
901122	1900	0.56	0.132	0.132	7.56	7.56	-28.0	4.0	-2.7	30.9	31.6	24.7	0.20
901122	2200	0.51	0.113	0.132	8.87	7.56	-8.0	-10.0	-7.8	30.0	31.0	24.0	0.19
901123	0100	0.49	0.123	0.123	8.16	8.16	-12.0	-14.0	-15.0	27.0	27.9	22.4	0.19
901123	0400	0.50	0.132	0.132	7.56	7.56	-14.0	-12.0	-13.6	26.4	26.4	22.7	0.19
901123	0700	0.49	0.113	0.123	8.87	8.16	-16.0	-16.0	-13.6	26.2	25.9	22.9	0.22
901123	1000	0.48	0.113	0.113	8.87	8.87	-16.0	-14.0	-10.1	27.7	27.5	27.0	0.20
901123	1300	0.45	0.113	0.113	8.87	8.87	-4.0	-12.0	-14.0	27.8	27.7	24.8	0.22
901123	1600	0.44	0.113	0.113	8.87	8.87	-2.0	-10.0	-3.6	27.5	26.2	23.4	0.19
901123	1900	0.49	0.103	0.113	9.71	8.87	-10.0	-10.0	-13.9	31.9	28.1	28.7	0.20
901123	2200	0.41	0.113	0.113	8.87	8.87	0.0	-16.0	-16.8	34.3	28.2	23.6	0.20
901124	0100	0.35	0.103	0.103	9.71	9.71	-6.0	-18.0	-15.6	33.5	29.5	23.3	0.21
901124	0400	0.30	0.103	0.103	9.71	9.71	10.0	-12.0	-12.9	35.0	31.8	26.6	0.25
901124	0700	0.30	0.093	0.093	10.72	10.72	-18.0	-6.0	-16.3	34.3	32.6	23.6	0.29
901124	1000	0.35	0.093	0.093	10.72	10.72	-12.0	-10.0	7.1	51.8	26.4	24.6	0.29
901124	1300	0.34	0.093	0.093	10.72	10.72	4.0	2.0	0.1	36.4	31.0	27.3	0.27
901124	1600	0.35	0.083	0.093	11.98	10.72	-8.0	-10.0	-5.6	32.0	31.9	27.6	0.25
901124	1900	0.36	0.093	0.093	10.72	10.72	18.0	-8.0	-4.8	31.0	31.9	28.1	0.28
901124	2200	0.34	0.093	0.093	10.72	10.72	-6.0	-6.0	-8.4	32.3	27.9	22.8	0.30
901125	0100	0.32	0.093	0.093	10.72	10.72	-8.0	-6.0	-15.1	32.3	25.6	23.6	0.24
901125	1000	0.26	0.093	0.103	10.72	9.71	-2.0	-54.0	-22.0	40.6	23.5	28.8	0.30
901125	1300	0.26	0.103	0.103	9.71	9.71	-30.0	-56.0	-33.5	43.1	18.1	27.5	0.23
901125	1600	0.27	0.250	0.103	4.01	9.71	-58.0	-58.0	-38.5	41.1	15.3	34.7	0.20
901125	1900	0.27	0.152	0.103	6.59	9.71	-40.0	-50.0	-39.4	33.9	16.4	29.2	0.22
901125	2200	0.28	0.152	0.103	6.59	9.71	-44.0	-56.0	-40.8	38.2	23.8	35.9	0.21
901126	0100	0.28	0.064	0.064	15.63	15.63	-22.0	-52.0	-39.6	34.2	18.0	13.1	0.25
901126	0400	0.27	0.064	0.064	15.63	15.63	-24.0	-52.0	-37.7	38.6	26.4	17.6	0.26
901126	0700	0.26	0.064	0.064	15.63	15.63	-22.0	-46.0	-32.9	38.0	22.9	21.4	0.36
901126	1000	0.28	0.054	0.064	18.45	15.63	-4.0	-24.0	-29.3	35.4	23.3	22.6	0.34
901126	1300	0.32	0.054	0.054	18.45	18.45	-2.0	-48.0	-32.3	40.4	23.8	27.6	0.46
901126	1600	0.37	0.054	0.054	18.45	18.45	-4.0	-4.0	-24.2	35.6	24.2	19.7	0.41
901126	1900	0.39	0.054	0.054	18.45	18.45	-4.0	-4.0	-18.2	31.2	24.6	26.5	0.50
901126	2200	0.44	0.054	0.054	18.45	18.45	-2.0	-2.0	-13.8	29.3	25.8	23.2	0.59
901127	0100	0.45	0.054	0.054	18.45	18.45	-4.0	-4.0	-14.6	26.1	24.5	21.3	0.52
901127	0400	0.48	0.054	0.054	18.45	18.45	-2.0	-4.0	-12.6	27.7	25.9	23.4	0.33
901127	0700	0.42	0.054	0.054	18.45	18.45	-2.0	-2.0	-12.5	30.0	28.8	28.1	0.55
901127	1000	0.45	0.064	0.054	15.63	18.45	-6.0	-4.0	-13.3	27.3	27.7	32.4	0.36

(Sheet 12 of 37)

Table A1 (Continued)

Date	Time EST	H <sub>m</sub> m	f <sub>p,FD</sub> Hz	f <sub>p,FS</sub> Hz	T <sub>p,FD</sub> sec	T <sub>p,FS</sub> sec	θ <sub>p,FD</sub> deg	θ <sub>p,DS</sub> deg	θ <sub>p,SW</sub> deg	Δθ <sub>DS</sub> deg	Δθ <sub>SW</sub> deg	Δθ <sub>FOR</sub> deg	x
901127	1300	0.47	0.054	0.054	18.45	18.45	-4.0	-6.0	-18.9	35.8	29.5	18.8	0.45
901127	1600	0.48	0.054	0.054	18.45	18.45	-4.0	-4.0	-20.6	41.0	35.1	18.9	0.36
901127	1900	0.46	0.064	0.064	15.63	15.63	-4.0	-6.0	-14.4	36.3	32.6	22.8	0.32
901127	2200	0.48	0.064	0.064	15.63	15.63	-4.0	-6.0	-12.5	33.4	25.5	19.8	0.36
901128	0100	0.47	0.064	0.064	15.63	15.63	-16.0	-16.0	-24.7	36.8	29.0	23.3	0.30
901128	0400	0.45	0.064	0.074	15.63	13.56	-4.0	-4.0	-19.1	42.0	27.8	26.7	0.30
901128	0700	0.48	0.074	0.074	13.56	13.56	-14.0	-16.0	-24.9	45.1	26.2	22.7	0.25
901128	1000	0.53	0.191	0.074	5.24	13.56	-48.0	-50.0	-33.7	42.9	22.4	21.2	0.24
901128	1300	0.57	0.181	0.074	5.52	13.56	-46.0	-50.0	-37.2	39.1	19.4	26.4	0.27
901128	1600	0.58	0.181	0.181	5.52	5.52	-46.0	-48.0	-40.8	27.5	16.1	8.6	0.21
901128	1900	0.49	0.181	0.074	5.52	13.56	-48.0	-48.0	-35.1	34.1	15.4	18.3	0.21
901128	2200	0.49	0.074	0.074	13.56	13.56	-10.0	-48.0	-34.9	34.6	16.9	19.8	0.20
901129	0100	0.54	0.181	0.074	5.52	13.56	-46.0	-46.0	-39.9	27.1	15.0	22.9	0.22
901129	0400	0.54	0.152	0.074	6.59	13.56	-44.0	-48.0	-39.7	24.5	14.4	21.6	0.20
901129	0700	0.51	0.162	0.074	6.19	13.56	-42.0	-42.0	-39.6	22.6	14.6	20.1	0.19
901129	1000	1.13	0.181	0.181	5.52	5.52	50.0	50.0	47.9	20.8	17.0	9.8	0.19
901129	1300	1.71	0.162	0.162	6.19	6.19	40.0	40.0	43.7	15.8	15.4	7.5	0.20
901129	1600	1.59	0.162	0.162	6.19	6.19	36.0	36.0	42.1	21.7	16.8	11.6	0.24
901129	1900	1.67	0.171	0.171	5.83	5.83	40.0	40.0	37.8	23.3	16.4	16.5	0.22
901129	2200	1.87	0.152	0.152	6.59	6.59	26.0	34.0	34.9	22.3	16.9	13.4	0.21
901130	0100	2.31	0.142	0.142	7.04	7.04	26.0	26.0	37.6	22.4	18.6	14.2	0.23
901130	0400	2.00	0.142	0.132	7.04	7.56	30.0	30.0	37.9	23.5	17.1	16.2	0.26
901130	0700	1.84	0.142	0.142	7.04	7.04	22.0	40.0	36.5	26.2	17.2	16.5	0.23
901130	1000	1.69	0.142	0.132	7.04	7.56	24.0	24.0	32.1	26.4	18.8	15.1	0.18
901130	1300	1.51	0.142	0.142	7.04	7.04	20.0	22.0	30.4	27.2	21.0	14.9	0.17
901130	1600	1.27	0.132	0.132	7.56	7.56	18.0	16.0	28.4	26.9	23.8	17.9	0.19
901130	1900	1.11	0.103	0.113	9.71	8.87	-6.0	14.0	21.9	28.9	23.1	19.8	0.16
901130	2200	1.04	0.113	0.123	8.87	8.16	0.0	14.0	18.9	27.8	22.2	19.8	0.14
901201	0100	0.90	0.152	0.132	6.59	7.56	18.0	14.0	18.4	30.7	22.9	22.4	0.18
901201	0400	0.77	0.132	0.132	7.56	7.56	12.0	14.0	16.6	34.7	26.1	24.7	0.22
901201	0700	0.65	0.132	0.132	7.56	7.56	8.0	8.0	6.6	31.3	27.0	21.5	0.24
901201	1300	0.54	0.103	0.103	9.71	9.71	-12.0	-10.0	-4.4	27.5	26.6	21.9	0.20
901201	1900	0.49	0.074	0.113	13.56	8.87	-12.0	-10.0	-11.0	30.9	29.3	29.5	0.25
901202	0100	0.51	0.083	0.103	11.98	9.71	-12.0	-12.0	-14.1	23.4	22.3	24.6	0.23
901202	0700	0.44	0.074	0.093	13.56	10.72	-8.0	-10.0	-14.9	27.2	27.7	24.2	0.28
901202	1300	0.40	0.074	0.093	13.56	10.72	-10.0	-10.0	-24.9	29.2	27.8	27.3	0.24
901202	1900	0.43	0.103	0.103	9.71	9.71	-38.0	-10.0	-29.8	32.0	29.3	31.3	0.28
901203	0100	0.64	0.083	0.083	11.98	11.98	-14.0	-8.0	-9.9	33.5	29.4	18.0	0.19
901203	0700	1.07	0.210	0.210	4.75	4.75	4.0	2.0	-4.1	37.1	36.0	35.1	0.11
901203	1300	1.13	0.171	0.171	5.83	5.83	2.0	2.0	-4.8	29.9	31.7	24.4	0.14
901203	1900	1.41	0.142	0.132	7.04	7.56	-46.0	-46.0	-44.7	40.5	36.7	12.5	0.20
901204	0100	1.51	0.123	0.123	8.16	8.16	-34.0	-40.0	-35.1	32.7	22.2	10.9	0.18
901204	0700	1.60	0.074	0.113	13.56	8.87	-14.0	-42.0	-33.5	30.4	20.2	15.8	0.21
901204	1300	1.12	0.074	0.074	13.56	13.56	-8.0	-40.0	-26.5	37.5	30.7	21.4	0.16
901204	1900	0.94	0.074	0.074	13.56	13.56	-10.0	64.0	7.7	72.3	27.9	27.6	0.26
901205	0100	0.91	0.230	0.083	4.35	11.98	52.0	54.0	22.9	51.9	18.2	23.4	0.19
901205	0700	0.92	0.162	0.162	6.19	6.19	34.0	34.0	31.6	41.2	18.6	9.7	0.19
901205	1300	0.84	0.152	0.162	6.59	6.19	24.0	24.0	31.7	42.0	15.6	12.5	0.17
901205	1900	0.60	0.171	0.093	5.83	10.72	40.0	40.0	29.9	50.5	23.7	27.8	0.19
901206	0100	0.56	0.152	0.083	6.59	11.98	28.0	28.0	18.4	43.2	19.5	20.3	0.21
901206	0700	0.50	0.083	0.083	11.98	11.98	-10.0	-10.0	9.3	39.5	26.3	18.9	0.26
901206	1300	0.47	0.074	0.074	13.56	13.56	-10.0	-10.0	-6.7	31.5	30.8	21.3	0.27
901206	1900	0.44	0.074	0.074	13.56	13.56	-6.0	-8.0	-15.9	24.5	20.7	16.3	0.41
901207	0100	0.41	0.083	0.074	11.98	13.56	-10.0	-10.0	-14.6	28.2	24.8	27.3	0.37
901207	0700	0.40	0.074	0.074	13.56	13.56	-12.0	-12.0	-18.6	27.9	27.1	23.1	0.34

(Sheet 13 of 37)

Table A1 (Continued)

Date	Time EST	H <sub>m</sub> m	f <sub>p,FD</sub> Hz	f <sub>p,FS</sub> Hz	T <sub>p,FD</sub> sec	T <sub>p,FS</sub> sec	θ <sub>p,FD</sub> deg	θ <sub>p,DS</sub> deg	θ <sub>p,SW</sub> deg	Δθ <sub>DS</sub> deg	Δθ <sub>SW</sub> deg	Δθ <sub>DDP</sub> deg	χ
901207	1300	0.41	0.083	0.074	11.98	13.56	-8.0	-8.0	-19.9	30.8	28.2	23.8	0.36
901207	1900	0.44	0.083	0.083	11.98	11.98	-12.0	-10.0	-14.2	29.9	29.8	22.6	0.30
901208	0100	0.94	0.259	0.240	3.86	4.17	46.0	46.0	29.3	35.7	26.5	22.7	0.12
901208	0700	1.59	0.191	0.191	5.24	5.24	46.0	46.0	30.9	49.4	28.2	26.3	0.14
901208	1300	2.10	0.132	0.171	7.56	5.83	-2.0	44.0	22.1	46.1	22.6	19.4	0.19
901208	1600	2.28	0.152	0.162	6.59	6.19	32.0	32.0	21.7	37.6	22.3	21.0	0.18
901208	1900	2.02	0.152	0.142	6.59	7.04	28.0	30.0	26.0	33.1	23.4	21.1	0.16
901208	2200	2.03	0.142	0.152	7.04	6.59	24.0	40.0	28.9	30.4	21.9	21.2	0.17
901209	0100	2.05	0.152	0.142	6.59	7.04	36.0	30.0	29.6	26.1	21.6	18.1	0.17
901209	0400	2.18	0.142	0.142	7.04	7.04	22.0	22.0	27.0	27.9	20.3	16.5	0.20
901209	0700	2.06	0.132	0.132	7.56	7.56	22.0	20.0	24.9	30.0	21.8	17.3	0.17
901209	1300	1.76	0.123	0.123	8.16	8.16	16.0	16.0	18.9	31.6	21.9	16.8	0.19
901209	1900	1.30	0.113	0.113	8.87	8.87	12.0	14.0	12.3	28.8	22.4	23.3	0.14
901210	0100	1.00	0.103	0.113	9.71	8.87	-6.0	14.0	7.3	28.3	23.0	26.2	0.23
901210	0700	0.80	0.113	0.103	8.87	9.71	14.0	12.0	6.9	26.5	24.9	27.4	0.16
901210	1300	0.59	0.093	0.093	10.72	10.72	-14.0	-10.0	-8.2	24.9	24.5	20.5	0.24
901210	1900	0.51	0.083	0.083	11.98	11.98	-10.0	-6.0	-9.1	30.0	23.3	18.5	0.23
901211	0100	1.30	0.191	0.191	5.24	5.24	38.0	40.0	40.6	21.6	19.8	10.7	0.15
901211	0700	1.27	0.171	0.171	5.83	5.83	40.0	38.0	38.2	23.3	18.2	10.6	0.17
901211	1300	1.20	0.162	0.142	6.19	7.04	38.0	36.0	30.8	27.7	24.1	19.4	0.16
901211	1900	0.92	0.132	0.132	7.56	7.56	18.0	18.0	20.9	29.1	24.6	18.0	0.16
901212	0100	0.75	0.074	0.074	13.56	13.56	-10.0	16.0	12.6	33.5	28.1	14.5	0.18
901212	0700	0.63	0.074	0.074	13.56	13.56	-10.0	-14.0	1.2	31.5	29.1	18.1	0.22
901212	1300	0.52	0.074	0.074	13.56	13.56	-10.0	-8.0	-3.5	28.9	29.9	23.4	0.30
901212	1900	0.45	0.074	0.074	13.56	13.56	-10.0	-12.0	-11.9	26.5	27.8	20.9	0.24
901213	0100	0.45	0.201	0.083	4.98	11.98	-50.0	-50.0	-29.5	42.8	21.6	23.6	0.24
901213	0700	0.43	0.152	0.083	6.59	11.98	-44.0	-46.0	-35.5	34.8	20.3	21.3	0.20
901213	1300	0.37	0.162	0.083	6.19	11.98	-46.0	-46.0	-32.0	28.9	18.6	20.1	0.25
901213	1900	0.35	0.152	0.142	6.59	7.04	-44.0	-46.0	-34.9	30.0	17.0	14.2	0.19
901214	0100	1.13	0.191	0.191	5.24	5.24	54.0	54.0	48.7	21.9	18.9	11.0	0.20
901214	0700	2.19	0.162	0.142	6.19	7.04	40.0	38.0	35.7	23.4	19.8	16.8	0.18
901214	1000	1.83	0.132	0.132	7.56	7.56	22.0	22.0	30.6	25.3	22.3	16.9	0.15
901214	1300	1.60	0.142	0.142	7.04	7.04	24.0	30.0	31.8	26.7	24.2	17.0	0.13
901214	1900	1.31	0.142	0.132	7.04	7.56	32.0	28.0	29.4	30.2	29.5	22.0	0.13
901215	0100	1.23	0.171	0.181	5.83	5.52	2.0	6.0	13.1	36.0	36.6	35.9	0.11
901215	0700	1.03	0.152	0.171	6.59	5.83	16.0	12.0	2.2	48.2	49.1	53.8	0.14
901215	1300	1.05	0.162	0.162	6.19	6.19	-34.0	-38.0	-34.7	37.4	33.6	32.3	0.11
901215	1900	1.06	0.152	0.142	6.59	7.04	-44.0	-44.0	-38.6	37.9	34.8	36.2	0.14
901216	0100	0.81	0.152	0.142	6.59	7.04	-44.0	-44.0	-42.4	31.8	27.5	34.9	0.13
901216	0700	0.59	0.152	0.142	6.59	7.04	-44.0	-46.0	-43.4	21.4	16.3	16.1	0.19
901216	1300	0.35	0.123	0.132	8.16	7.56	-36.0	-40.0	-37.2	30.8	26.1	18.0	0.20
901216	1900	0.69	0.250	0.250	4.01	4.01	56.0	60.0	34.3	52.3	27.1	21.6	0.15
901217	0100	0.62	0.220	0.240	4.54	4.17	46.0	46.0	28.1	55.4	28.7	24.6	0.13
901217	0700	0.77	0.171	0.171	5.83	5.83	32.0	32.0	30.6	31.7	27.0	18.4	0.16
901217	1300	0.65	0.162	0.162	6.19	6.19	14.0	18.0	25.4	35.8	23.7	15.8	0.14
901217	1900	0.60	0.181	0.191	5.52	5.24	28.0	26.0	14.1	45.1	28.5	18.0	0.18
901218	0100	0.54	0.123	0.152	8.16	6.59	-20.0	-20.0	5.9	42.4	33.7	35.4	0.15
901218	0700	0.47	0.123	0.123	8.16	8.16	-14.0	-12.0	-0.8	38.9	40.7	28.5	0.19
901218	1300	0.44	0.074	0.123	13.56	8.16	-6.0	-40.0	-33.2	38.3	24.9	23.8	0.21
901218	1900	0.59	0.308	0.298	3.25	3.35	-56.0	-48.0	-42.3	22.5	13.3	8.5	0.22
901219	0100	0.54	0.152	0.123	6.59	8.16	-42.0	-56.0	-41.5	27.4	12.9	14.0	0.17
901219	0700	0.52	0.142	0.103	7.04	9.71	-42.0	-42.0	-40.5	27.5	17.3	25.7	0.18
901219	1300	0.66	0.113	0.113	8.87	8.87	-38.0	-40.0	-1.0	62.2	26.8	24.3	0.13

(Sheet 14 of 37)

Table A1 (Continued)

Date	Time EST	H <sub>m</sub> m	f <sub>p,FD</sub> Hz	f <sub>p,FS</sub> Hz	T <sub>p,FD</sub> sec	T <sub>p,FS</sub> sec	θ <sub>p,FD</sub> deg	θ <sub>p,DS</sub> deg	θ <sub>p,SW</sub> deg	Δθ <sub>DS</sub> deg	Δθ <sub>SW</sub> deg	Δθ <sub>FD</sub> deg	x
901219	1900	1.09	0.201	0.201	4.98	4.98	10.0	6.0	16.2	34.9	29.0	19.4	0.12
901220	0100	1.23	0.191	0.191	5.24	5.24	38.0	38.0	29.1	33.2	27.1	20.2	0.10
901220	0700	1.52	0.171	0.171	5.83	5.83	38.0	36.0	28.0	35.8	31.2	22.4	0.12
901220	1300	1.57	0.162	0.152	6.19	6.59	30.0	28.0	25.4	35.6	32.3	27.4	0.10
901220	1900	1.63	0.152	0.152	6.59	6.59	20.0	24.0	17.6	41.1	36.3	26.9	0.12
901221	0100	1.62	0.132	0.132	7.56	7.56	8.0	6.0	5.0	42.1	42.1	29.9	0.12
901221	0700	1.56	0.132	0.142	7.56	7.04	8.0	8.0	-8.0	38.7	40.9	33.6	0.15
901221	1300	1.59	0.113	0.123	8.87	8.16	-16.0	-14.0	-20.6	34.0	35.6	27.8	0.14
901221	1900	1.62	0.123	0.123	8.16	8.16	-16.0	-18.0	-21.7	32.7	34.6	22.3	0.14
901222	0100	1.36	0.123	0.123	8.16	8.16	-6.0	-10.0	-23.5	33.9	35.8	27.3	0.15
901222	0700	1.35	0.113	0.123	8.87	8.16	-10.0	-12.0	-23.8	31.0	30.2	24.3	0.14
901222	1300	1.09	0.132	0.113	7.56	8.87	-28.0	-24.0	-24.6	32.0	29.1	27.2	0.15
901222	1900	1.06	0.123	0.123	8.16	8.16	-6.0	-6.0	-21.0	31.1	29.3	25.7	0.13
901223	0100	0.92	0.113	0.113	8.87	8.87	-18.0	-26.0	-25.2	32.9	30.1	24.4	0.15
901223	0700	1.06	0.142	0.123	7.04	8.16	-26.0	-26.0	-27.9	33.2	24.7	26.6	0.14
901223	1300	1.02	0.142	0.132	7.04	7.56	-40.0	-26.0	-32.1	28.7	23.0	16.5	0.14
901223	1900	0.90	0.093	0.093	10.72	10.72	-16.0	-40.0	-31.3	28.8	21.5	21.4	0.14
901224	0100	0.83	0.093	0.093	10.72	10.72	-20.0	-40.0	-32.9	28.2	21.6	23.2	0.16
901224	0700	0.90	0.162	0.093	6.19	10.72	-42.0	-42.0	-35.7	27.0	17.4	25.0	0.18
901224	1300	1.01	0.093	0.093	10.72	10.72	-22.0	58.0	13.7	84.2	24.2	20.4	0.16
901224	1900	1.92	0.162	0.152	6.19	6.59	34.0	34.0	32.5	22.3	18.2	12.3	0.17
901225	0100	1.53	0.142	0.142	7.04	7.04	26.0	26.0	32.2	33.8	21.9	13.5	0.18
901225	0700	1.23	0.171	0.093	5.83	10.72	32.0	40.0	26.3	50.1	25.6	20.7	0.12
901225	1300	1.11	0.093	0.093	10.72	10.72	-18.0	-18.0	18.4	51.9	25.2	20.4	0.14
901225	1900	1.09	0.083	0.083	11.98	11.98	-20.0	-18.0	0.4	37.4	27.0	22.3	0.13
901226	0100	1.06	0.083	0.083	11.98	11.98	-18.0	-18.0	-4.9	34.1	29.2	23.5	0.15
901226	0700	1.00	0.093	0.093	10.72	10.72	-22.0	-18.0	-8.9	33.3	26.2	24.4	0.17
901226	1300	1.15	0.083	0.083	11.98	11.98	-18.0	-14.0	9.1	43.7	23.6	26.0	0.15
901226	1900	1.13	0.093	0.093	10.72	10.72	-18.0	26.0	10.7	41.1	22.8	19.4	0.12
901227	0100	1.35	0.201	0.191	4.98	5.24	42.0	42.0	19.6	43.6	24.8	24.1	0.13
901227	0700	1.57	0.171	0.171	5.83	5.83	14.0	18.0	18.9	36.6	24.2	21.2	0.10
901227	1300	1.78	0.162	0.162	6.19	6.19	26.0	26.0	20.9	33.3	26.6	24.6	0.11
901227	1600	1.85	0.162	0.162	6.19	6.19	22.0	16.0	19.5	32.8	26.1	20.0	0.11
901227	1900	1.83	0.152	0.152	6.59	6.59	14.0	10.0	12.6	33.9	27.4	21.0	0.10
901227	2200	1.91	0.132	0.142	7.56	7.04	4.0	8.0	9.5	29.7	28.3	25.6	0.11
901228	0100	1.96	0.132	0.132	7.56	7.56	6.0	4.0	10.1	35.7	34.7	25.5	0.14
901228	0400	1.88	0.113	0.113	8.87	8.87	18.0	8.0	15.2	35.8	36.7	26.9	0.14
901228	0700	1.67	0.103	0.113	9.71	8.87	2.0	6.0	12.2	34.6	36.2	32.9	0.14
901228	1300	1.37	0.113	0.113	8.87	8.87	14.0	14.0	7.6	31.2	32.5	22.6	0.15
901228	1900	1.07	0.113	0.103	8.87	9.71	2.0	4.0	9.5	35.2	32.5	28.4	0.14
901229	0100	1.07	0.103	0.103	9.71	9.71	16.0	14.0	15.5	35.4	34.4	33.7	0.19
901229	0700	1.15	0.093	0.103	10.72	9.71	16.0	16.0	19.5	31.0	31.9	31.3	0.17
901229	1300	1.26	0.093	0.093	10.72	10.72	-6.0	-4.0	4.7	28.9	30.4	23.4	0.15
901229	1900	1.14	0.093	0.093	10.72	10.72	-4.0	12.0	6.0	27.7	29.7	22.2	0.17
901230	0100	1.06	0.093	0.093	10.72	10.72	0.0	-4.0	-5.5	32.3	31.7	22.4	0.15
901230	0700	0.91	0.083	0.093	11.98	10.72	-10.0	-12.0	-18.8	36.8	31.1	30.8	0.19
901230	1300	0.86	0.093	0.093	10.72	10.72	-22.0	-22.0	-29.0	33.7	29.5	29.5	0.15
901230	1900	0.77	0.093	0.093	10.72	10.72	-22.0	-24.0	-27.2	28.7	24.2	25.8	0.18
901231	0100	0.71	0.103	0.093	9.71	10.72	-34.0	-36.0	-30.0	23.0	21.5	24.8	0.19
901231	0700	0.82	0.093	0.093	10.72	10.72	-16.0	-40.0	9.2	90.5	23.2	22.1	0.23
901231	1300	1.67	0.162	0.162	6.19	6.19	36.0	38.0	32.7	24.9	18.6	11.3	0.15
901231	1900	1.51	0.083	0.142	11.98	7.04	-18.0	34.0	27.2	43.8	22.9	16.3	0.16

(Sheet 15 of 37)

Table A1 (Continued)

Date	Time EST	H <sub>m</sub> m	f <sub>p,FD</sub> Hz	f <sub>p,FS</sub> Hz	T <sub>p,FD</sub> sec	T <sub>p,FS</sub> sec	θ <sub>p,FD</sub> deg	θ <sub>p,FS</sub> deg	θ <sub>p,SW</sub> deg	Δθ <sub>DS</sub> deg	Δθ <sub>SW</sub> deg	Δθ <sub>DP</sub> deg	X
910101	0100	1.42	0.083	0.083	11.98	11.98	-18.0	30.0	22.4	45.7	24.4	18.9	0.12
910101	0700	1.42	0.171	0.171	5.83	5.83	40.0	42.0	26.1	45.2	29.8	26.8	0.13
910101	1300	1.19	0.093	0.171	10.72	5.83	-28.0	14.0	16.6	47.0	32.0	28.0	0.11
910101	1900	1.23	0.171	0.171	5.83	5.83	16.0	16.0	12.3	43.9	32.4	27.1	0.15
910102	0100	1.05	0.093	0.093	10.72	10.72	-32.0	10.0	2.7	42.6	34.8	23.8	0.12
910102	0700	1.22	0.103	0.152	9.71	6.59	-38.0	-40.0	-6.3	48.0	44.8	53.0	0.17
910102	1300	1.25	0.103	0.132	9.71	7.56	-26.0	44.0	15.3	60.1	25.9	34.2	0.16
910102	1900	1.23	0.171	0.171	5.83	5.83	22.0	22.0	12.0	41.5	26.3	26.8	0.15
910103	0100	0.93	0.171	0.171	5.83	5.83	26.0	18.0	12.2	36.7	24.9	24.9	0.12
910103	0700	0.80	0.181	0.123	5.52	8.16	16.0	10.0	3.0	36.4	27.3	30.8	0.18
910103	1300	0.67	0.132	0.103	7.56	9.71	-16.0	-16.0	-0.9	36.7	26.5	24.5	0.15
910103	1900	0.75	0.123	0.123	8.16	8.16	2.0	0.0	0.8	34.0	28.3	20.8	0.18
910104	0100	0.60	0.093	0.113	10.72	8.87	-28.0	-4.0	-2.7	33.0	26.9	28.4	0.19
910104	0700	1.23	0.201	0.201	4.98	4.98	38.0	40.0	34.2	27.3	20.9	14.1	0.14
910104	1300	1.34	0.171	0.171	5.83	5.83	32.0	32.0	31.4	29.3	21.0	17.4	0.16
910104	1900	1.09	0.171	0.171	5.83	5.83	18.0	16.0	20.2	32.5	23.4	13.5	0.11
910105	0100	1.11	0.181	0.191	5.52	5.24	22.0	22.0	15.9	33.4	24.6	21.3	0.11
910105	0700	1.17	0.181	0.191	5.52	5.24	18.0	20.0	13.3	40.2	27.4	23.6	0.12
910105	1300	1.05	0.181	0.191	5.52	5.24	12.0	12.0	6.9	40.9	28.6	24.1	0.13
910105	1900	0.98	0.152	0.162	6.59	6.19	-20.0	-22.0	1.5	40.2	26.9	22.2	0.12
910106	0100	0.78	0.152	0.152	6.59	6.59	-22.0	-20.0	-7.0	37.3	31.3	25.9	0.17
910106	0700	0.60	0.162	0.152	6.19	6.59	-24.0	-24.0	-25.4	33.7	33.2	25.1	0.16
910106	1300	0.48	0.103	0.113	9.71	8.87	-30.0	-32.0	-32.9	31.3	31.1	26.2	0.22
910106	1900	0.49	0.113	0.113	8.87	8.87	-28.0	-28.0	-32.6	30.7	29.0	23.1	0.23
910107	0100	0.52	0.113	0.113	8.87	8.87	-20.0	-24.0	-25.8	29.5	27.9	23.4	0.25
910107	0700	0.51	0.113	0.113	8.87	8.87	-36.0	-38.0	-31.1	33.7	30.5	24.3	0.22
910107	1300	1.87	0.152	0.152	6.59	6.59	40.0	38.0	37.0	20.4	19.8	19.2	0.18
910107	1600	2.80	0.132	0.132	7.56	7.56	32.0	30.0	30.5	23.0	23.0	20.2	0.18
910107	1900	3.07	0.123	0.113	8.16	8.87	22.0	16.0	23.0	24.5	24.9	21.7	0.18
910107	2200	3.12	0.123	0.113	8.16	8.87	20.0	16.0	20.9	27.0	24.6	21.3	0.18
910108	0100	3.03	0.113	0.113	8.87	8.87	12.0	14.0	24.5	28.1	24.8	19.0	0.20
910108	0400	2.81	0.113	0.113	8.87	8.87	16.0	16.0	21.4	28.5	24.1	21.5	0.17
910108	0700	2.87	0.123	0.123	8.16	8.16	8.0	12.0	15.5	27.8	25.5	20.3	0.15
910108	1300	3.10	0.123	0.113	8.16	8.87	12.0	12.0	12.0	26.4	25.8	20.7	0.15
910108	1600	3.17	0.093	0.103	10.72	9.71	-2.0	2.0	9.2	25.0	25.0	22.5	0.14
910108	1900	2.87	0.103	0.083	9.71	11.98	12.0	12.0	7.8	26.7	27.4	24.1	0.13
910108	2200	3.27	0.083	0.083	11.98	11.98	-8.0	-4.0	10.6	30.6	30.8	20.6	0.15
910109	0100	3.19	0.083	0.083	11.98	11.98	-12.0	-8.0	2.1	31.0	31.4	21.0	0.13
910109	0400	2.98	0.083	0.083	11.98	11.98	-14.0	-6.0	-3.2	29.5	30.2	24.1	0.13
910109	0700	2.79	0.083	0.083	11.98	11.98	-12.0	-10.0	0.7	30.4	30.2	25.6	0.13
910109	1000	2.80	0.093	0.083	10.72	11.98	-6.0	-2.0	8.6	29.3	28.5	24.9	0.14
910109	1300	2.79	0.083	0.083	11.98	11.98	-10.0	-10.0	3.6	30.2	27.5	21.4	0.14
910109	1600	2.35	0.083	0.083	11.98	11.98	-12.0	-10.0	3.4	30.6	26.3	22.5	0.14
910109	1900	1.89	0.093	0.083	10.72	11.98	-14.0	0.0	4.3	28.2	24.5	26.2	0.13
910110	0100	1.70	0.093	0.093	10.72	10.72	-12.0	-4.0	5.3	31.1	24.5	24.5	0.17
910110	0700	1.50	0.093	0.093	10.72	10.72	-18.0	14.0	5.7	34.4	23.7	25.2	0.15
910110	1300	1.53	0.093	0.093	10.72	10.72	-14.0	14.0	17.3	31.4	23.0	23.9	0.15
910110	1900	1.18	0.093	0.093	10.72	10.72	-14.0	14.0	11.3	34.3	24.7	24.0	0.15
910111	0100	1.49	0.093	0.093	10.72	10.72	10.0	12.0	21.4	34.7	29.4	24.6	0.13
910111	0700	1.71	0.152	0.152	6.59	6.59	14.0	6.0	14.4	28.4	27.6	18.7	0.13
910111	1000	1.58	0.142	0.142	7.04	7.04	10.0	10.0	9.5	26.0	26.3	17.1	0.13
910111	1300	1.66	0.132	0.132	7.56	7.56	14.0	14.0	13.3	31.2	33.0	20.5	0.13
910111	1600	1.72	0.132	0.132	7.56	7.56	8.0	8.0	9.4	37.7	39.2	27.2	0.14
910111	1900	2.12	0.123	0.123	8.16	8.16	-28.0	-20.0	-30.0	38.1	40.6	33.9	0.17
910111	2200	2.29	0.113	0.113	8.87	8.87	-26.0	-26.0	-31.9	33.2	34.4	26.4	0.16

(Sheet 16 of 37)

Table A1 (Continued)

Date	Time EST	H <sub>m</sub> m	f <sub>p,FD</sub> Hz	f <sub>p,FS</sub> Hz	T <sub>p,FD</sub> sec	T <sub>p,FS</sub> sec	θ <sub>p,FD</sub> deg	θ <sub>p,DS</sub> deg	θ <sub>p,SW</sub> deg	Δθ <sub>DS</sub> deg	Δθ <sub>SW</sub> deg	Δθ <sub>DP</sub> deg	χ
910112	0100	2.34	0.113	0.113	8.87	8.87	-10.0	-18.0	-18.2	36.3	35.8	36.8	0.15
910112	0400	2.05	0.113	0.103	8.87	9.71	-42.0	-32.0	-19.3	40.0	38.8	36.8	0.15
910112	0700	1.74	0.103	0.103	9.71	9.71	-22.0	-22.0	-17.7	37.2	36.0	31.0	0.15
910112	1300	1.43	0.103	0.113	9.71	8.87	-22.0	-24.0	-16.5	38.9	37.7	36.5	0.15
910112	1900	1.19	0.123	0.113	8.16	8.87	-38.0	-38.0	-25.5	40.4	39.3	37.3	0.17
910113	0100	1.39	0.289	0.113	3.47	8.87	52.0	50.0	3.6	65.6	26.3	32.2	0.21
910113	0700	1.41	0.191	0.181	5.24	5.52	40.0	48.0	24.5	37.9	20.3	12.8	0.21
910113	1300	1.10	0.171	0.171	5.83	5.83	34.0	34.0	24.2	34.4	21.0	14.0	0.16
910113	1900	1.03	0.171	0.171	5.83	5.83	32.0	30.0	23.2	26.1	17.7	7.6	0.21
910114	0100	0.87	0.162	0.171	6.19	5.83	26.0	32.0	21.0	32.4	19.3	10.4	0.17
910114	0700	0.77	0.162	0.162	6.19	6.19	28.0	26.0	20.2	31.4	20.0	10.5	0.24
910114	1300	0.58	0.064	0.103	15.63	9.71	-12.0	-10.0	1.1	33.2	26.9	26.8	0.24
910114	1900	0.56	0.064	0.064	15.63	15.63	-8.0	-10.0	-10.3	27.7	26.7	15.0	0.24
910115	0100	0.53	0.064	0.064	15.63	15.63	-8.0	-10.0	-10.5	25.4	25.3	19.5	0.31
910115	0700	0.47	0.064	0.064	15.63	15.63	-10.0	-10.0	-15.8	27.5	25.8	20.4	0.27
910115	1300	0.53	0.064	0.064	15.63	15.63	-10.0	-10.0	-19.6	22.6	22.6	15.6	0.28
910115	1900	0.48	0.064	0.064	15.63	15.63	-10.0	-10.0	-21.6	29.5	26.3	18.0	0.30
910116	0100	0.57	0.123	0.074	8.16	13.56	-36.0	-12.0	-29.8	32.7	28.5	24.5	0.25
910116	0700	1.76	0.123	0.123	8.16	8.16	-32.0	-30.0	-36.1	19.4	19.4	15.6	0.16
910116	1000	1.62	0.113	0.113	8.87	8.87	-34.0	-40.0	-34.7	20.0	19.9	19.6	0.14
910116	1300	1.38	0.113	0.113	8.87	8.87	-30.0	-28.0	-30.5	22.8	22.6	18.9	0.12
910116	1600	1.27	0.123	0.113	8.16	8.87	-40.0	-28.0	-31.3	24.7	23.8	19.5	0.14
910116	1900	1.07	0.123	0.123	8.16	8.16	-28.0	-28.0	-31.4	23.9	23.1	15.1	0.17
910116	2200	0.91	0.113	0.113	8.87	8.87	-40.0	-32.0	-38.2	21.0	21.5	17.4	0.16
910117	0100	0.75	0.113	0.113	8.87	8.87	-28.0	-36.0	-38.2	25.3	23.3	22.3	0.17
910117	0400	0.73	0.103	0.103	9.71	9.71	-30.0	-30.0	-35.5	24.4	23.1	17.4	0.20
910117	0700	0.69	0.113	0.103	8.87	9.71	-38.0	-32.0	-33.9	22.8	22.8	19.8	0.20
910117	1000	0.54	0.113	0.103	8.87	9.71	-38.0	-36.0	-26.2	29.1	22.9	20.8	0.22
910117	1300	0.53	0.113	0.113	8.87	8.87	-30.0	-26.0	-2.8	77.7	19.8	18.2	0.20
910117	1600	0.57	0.113	0.113	8.87	8.87	-32.0	62.0	0.4	85.8	21.4	19.8	0.19
910117	1900	0.47	0.113	0.113	8.87	8.87	-16.0	-18.0	-8.9	43.8	25.7	21.0	0.29
910117	2200	0.42	0.103	0.113	9.71	8.87	-24.0	-22.0	-8.2	40.3	35.9	20.9	0.25
910118	0100	0.38	0.113	0.113	8.87	8.87	-24.0	-12.0	-3.0	41.4	29.2	26.3	0.26
910118	0400	0.38	0.123	0.123	8.16	8.16	-40.0	-40.0	-3.8	46.6	29.2	29.6	0.26
910118	0700	0.39	0.171	0.103	5.83	9.71	26.0	28.0	-5.1	47.8	28.1	37.0	0.25
910118	1000	0.36	0.181	0.103	5.52	9.71	30.0	32.0	-0.1	50.5	28.6	30.8	0.25
910118	1300	0.32	0.181	0.103	5.52	9.71	28.0	28.0	3.2	50.3	29.7	31.1	0.26
910118	1600	0.32	0.132	0.093	7.56	10.72	-42.0	-10.0	4.2	57.4	29.9	35.5	0.28
910118	1900	0.28	0.132	0.093	7.56	10.72	-42.0	-40.0	4.0	50.4	38.6	38.9	0.35
910118	2200	0.24	0.103	0.103	9.71	9.71	-36.0	-12.0	-15.4	44.5	43.4	27.8	0.36
910119	0100	0.20	0.054	0.054	18.45	18.45	-12.0	-12.0	-8.4	42.4	38.2	25.7	0.40
910119	0400	0.20	0.054	0.054	18.45	18.45	-10.0	-10.0	-1.7	40.3	29.6	17.3	0.46
910119	0700	0.23	0.054	0.054	18.45	18.45	-10.0	-10.0	1.7	52.5	34.9	20.4	0.38
910119	1000	0.24	0.064	0.103	15.63	9.71	-10.0	-10.0	-9.2	40.6	38.0	25.8	0.35
910119	1300	0.26	0.064	0.103	15.63	9.71	-10.0	-10.0	-3.2	40.9	36.7	30.0	0.31
910119	1600	0.28	0.103	0.103	9.71	9.71	-30.0	12.0	-2.0	35.7	28.7	24.3	0.27
910119	1900	0.29	0.171	0.162	5.83	6.19	16.0	-8.0	-2.4	36.7	28.6	28.3	0.33
910119	2200	0.27	0.064	0.103	15.63	9.71	-10.0	-10.0	-8.7	36.8	33.8	31.3	0.31
910120	0100	0.28	0.064	0.064	15.63	15.63	-10.0	-10.0	-13.0	34.1	34.3	21.2	0.28
910120	0400	0.31	0.103	0.064	9.71	15.63	-32.0	-8.0	-17.2	32.3	30.9	21.7	0.31
910120	0700	0.80	0.259	0.259	3.86	3.86	62.0	64.0	38.5	56.0	43.1	43.0	0.24
910120	1000	0.94	0.220	0.220	4.54	4.54	30.0	16.0	27.1	37.4	28.7	26.4	0.14
910120	1300	0.77	0.201	0.210	4.98	4.75	18.0	18.0	18.1	41.2	26.1	29.0	0.13
910120	1600	0.73	0.093	0.210	10.72	4.75	-30.0	-30.0	10.3	52.3	23.5	17.9	0.14
910120	1900	0.65	0.083	0.083	11.98	11.98	-30.0	-30.0	-0.8	52.4	24.7	18.2	0.19
910120	2200	0.60	0.083	0.103	11.98	9.71	-32.0	-32.0	-15.8	39.0	22.8	16.8	0.19

(Sheet 17 of 37)

Table A1 (Continued)

Date	Time EST	H <sub>m</sub> m	f <sub>p,FD</sub> Hz	f <sub>p,FS</sub> Hz	T <sub>p,FD</sub> sec	T <sub>p,FS</sub> sec	θ <sub>p,FD</sub> deg	θ <sub>p,DS</sub> deg	θ <sub>p,SW</sub> deg	Δθ <sub>DS</sub> deg	Δθ <sub>SW</sub> deg	Δθ <sub>DP</sub> deg	X
910121	0100	0.56	0.093	0.093	10.72	10.72	-30.0	-30.0	-20.2	31.0	27.8	16.6	0.24
910121	0400	0.57	0.103	0.103	9.71	9.71	-36.0	-38.0	-24.9	29.5	27.3	18.0	0.24
910121	0700	0.50	0.103	0.103	9.71	9.71	-34.0	-36.0	-31.6	29.4	28.8	18.8	0.22
910121	1000	0.48	0.308	0.093	3.25	10.72	60.0	60.0	5.6	84.3	21.4	24.7	0.26
910121	1300	0.63	0.289	0.298	3.47	3.35	54.0	52.0	33.4	34.0	12.7	6.1	0.25
910121	1600	1.20	0.191	0.191	5.24	5.24	46.0	48.0	42.3	14.0	10.5	6.9	0.21
910121	1900	1.43	0.162	0.162	6.19	6.19	32.0	36.0	38.2	19.6	15.9	9.0	0.20
910121	2200	1.52	0.162	0.181	6.19	5.52	34.0	36.0	38.7	22.7	17.0	13.7	0.23
910122	0100	1.41	0.171	0.171	5.83	5.83	38.0	34.0	38.0	22.4	16.7	14.2	0.21
910122	0400	1.50	0.152	0.171	6.59	5.83	26.0	24.0	33.2	24.1	18.1	14.0	0.20
910122	0700	1.60	0.171	0.171	5.83	5.83	28.0	26.0	32.6	25.1	17.9	12.8	0.21
910122	1000	1.71	0.152	0.152	6.59	6.59	24.0	22.0	30.5	26.7	18.2	12.9	0.24
910122	1300	1.69	0.123	0.152	8.16	6.59	10.0	24.0	31.9	29.2	18.4	15.4	0.21
910122	1600	1.48	0.132	0.132	7.56	7.56	8.0	22.0	25.2	29.6	19.5	18.2	0.17
910122	1900	1.32	0.132	0.132	7.56	7.56	20.0	20.0	25.1	26.9	20.6	15.2	0.18
910122	2200	1.09	0.142	0.132	7.04	7.56	18.0	20.0	22.1	27.7	22.2	15.4	0.18
910123	0100	0.95	0.142	0.142	7.04	7.04	20.0	22.0	24.2	30.7	24.0	18.5	0.18
910123	0400	0.79	0.123	0.152	8.16	6.59	4.0	10.0	16.9	30.2	20.9	16.3	0.19
910123	0700	0.71	0.113	0.113	8.87	8.87	8.0	12.0	19.2	29.8	24.4	21.9	0.20
910123	1000	0.63	0.113	0.113	8.87	8.87	8.0	10.0	16.2	30.0	26.6	22.0	0.23
910123	1300	0.59	0.113	0.113	8.87	8.87	-12.0	8.0	3.9	28.0	26.5	22.6	0.23
910123	1600	0.59	0.123	0.113	8.16	8.87	-12.0	-12.0	-5.2	25.0	25.0	22.0	0.22
910123	1900	0.54	0.103	0.103	9.71	9.71	-14.0	-12.0	-5.5	25.9	25.4	24.4	0.21
910123	2200	0.47	0.103	0.103	9.71	9.71	-10.0	-10.0	-4.5	24.3	24.8	20.3	0.24
910124	0100	0.42	0.093	0.103	10.72	9.71	-12.0	-10.0	-8.5	22.6	23.0	19.2	0.23
910124	0400	0.37	0.093	0.093	10.72	10.72	-14.0	-10.0	-11.0	24.4	24.6	22.6	0.26
910124	0700	0.38	0.093	0.093	10.72	10.72	-8.0	-10.0	-11.5	20.5	22.3	18.1	0.26
910124	1900	0.39	0.093	0.093	10.72	10.72	-10.0	-10.0	-13.2	23.3	24.4	21.3	0.23
910125	0100	0.37	0.093	0.093	10.72	10.72	-10.0	-12.0	-12.6	25.2	26.1	21.3	0.28
910125	0700	1.86	0.162	0.162	6.19	6.19	38.0	38.0	38.5	20.5	19.0	14.4	0.17
910125	1300	1.53	0.142	0.162	7.04	6.19	24.0	34.0	37.4	28.6	22.5	20.7	0.19
910125	1900	1.06	0.132	0.132	7.56	7.56	12.0	24.0	16.7	29.3	23.2	20.5	0.14
910126	0100	0.90	0.162	0.142	6.19	7.04	28.0	24.0	17.0	30.6	27.5	22.6	0.17
910126	0700	0.82	0.123	0.123	8.16	8.16	4.0	4.0	18.7	34.7	28.3	21.3	0.15
910126	1300	0.73	0.123	0.142	8.16	7.04	4.0	6.0	14.1	39.7	35.6	36.9	0.15
910126	1900	0.60	0.123	0.132	8.16	7.56	-14.0	-12.0	6.7	37.2	36.0	33.2	0.16
910127	0100	0.45	0.132	0.132	7.56	7.56	-36.0	-10.0	-12.5	37.1	37.6	31.4	0.17
910127	0700	0.33	0.132	0.132	7.56	7.56	-40.0	-40.0	-32.2	33.8	32.8	31.5	0.24
910127	1300	0.34	0.142	0.142	7.04	7.04	-42.0	-40.0	-32.5	30.0	25.0	17.6	0.22
910127	1900	0.37	0.132	0.132	7.56	7.56	-40.0	-38.0	-31.0	27.8	24.7	21.4	0.21
910128	0100	0.48	0.142	0.132	7.04	7.56	-34.0	-36.0	-37.3	30.0	26.5	20.0	0.18
910128	0700	0.63	0.171	0.132	5.83	7.56	-48.0	-50.0	-37.4	35.1	25.0	21.6	0.20
910128	1300	0.51	0.132	0.132	7.56	7.56	-36.0	-26.0	-36.7	28.9	24.2	18.1	0.17
910128	1900	0.67	0.103	0.103	9.71	9.71	-36.0	-36.0	-36.8	18.3	17.1	9.1	0.21
910129	0100	0.65	0.123	0.113	8.16	8.87	-38.0	-38.0	-33.7	23.7	22.6	14.9	0.16
910129	0700	0.64	0.113	0.113	8.87	8.87	-36.0	-28.0	-33.4	28.3	26.4	14.4	0.18
910129	1300	0.72	0.113	0.113	8.87	8.87	-36.0	-36.0	-22.3	34.3	31.4	23.1	0.11
910129	1900	0.71	0.113	0.123	8.87	8.16	-38.0	-28.0	-13.8	39.8	37.4	28.0	0.14
910130	0100	0.86	0.171	0.171	5.83	5.83	-4.0	0.0	-8.8	34.0	35.7	28.4	0.10
910130	0700	0.75	0.142	0.142	7.04	7.04	2.0	4.0	-13.4	36.8	36.1	29.9	0.21
910130	1300	0.52	0.123	0.132	8.16	7.56	-38.0	-38.0	-15.2	35.7	35.8	38.0	0.13
910130	1900	0.45	0.123	0.123	8.16	8.16	-40.0	-40.0	-35.7	42.0	41.2	34.5	0.19
910131	0100	0.39	0.123	0.123	8.16	8.16	-38.0	-40.0	-38.8	34.9	30.7	27.1	0.17
910131	0700	0.50	0.123	0.123	8.16	8.16	-42.0	-44.0	-43.8	26.4	22.8	18.9	0.19
910131	1300	0.70	0.279	0.220	3.59	4.54	56.0	56.0	26.4	49.2	20.5	17.1	0.18

(Sheet 18 of 37)

Table A1 (Continued)

Date	Time EST	$H_m$ m	$f_{p,FD}$ Hz	$f_{p,FS}$ Hz	$T_{p,FD}$ sec	$T_{p,FS}$ sec	$\theta_{p,FD}$ deg	$\theta_{p,FS}$ deg	$\theta_{p,SW}$ deg	$\Delta\theta_{DS}$ deg	$\Delta\theta_{SW}$ deg	$\Delta\theta_{DP}$ deg	$\chi$
910131	1900	1.15	0.201	0.191	4.98	5.24	48.0	50.0	40.5	20.1	16.2	11.4	0.19
910201	0100	1.46	0.152	0.152	6.59	6.59	22.0	34.0	34.6	21.3	16.6	12.1	0.15
910201	0700	1.12	0.142	0.142	7.04	7.04	22.0	24.0	30.8	22.9	21.8	12.4	0.15
910201	1300	0.85	0.142	0.152	7.04	6.59	14.0	14.0	20.5	32.0	25.2	17.3	0.09
910201	1900	0.69	0.171	0.171	5.83	5.83	22.0	24.0	17.2	40.5	32.2	21.9	0.14
910202	0100	0.59	0.152	0.123	6.59	8.16	26.0	-14.0	6.3	40.4	38.4	26.1	0.12
910202	0700	0.58	0.093	0.103	10.72	9.71	-28.0	-32.0	-15.2	39.2	37.3	30.0	0.16
910202	1300	0.54	0.103	0.103	9.71	9.71	-36.0	-36.0	-23.2	35.8	35.3	30.6	0.13
910202	1900	0.52	0.103	0.103	9.71	9.71	-38.0	-26.0	-27.7	29.2	29.0	24.5	0.17
910203	0100	0.48	0.093	0.093	10.72	10.72	-30.0	-30.0	-31.0	28.2	27.9	24.5	0.18
910203	0700	0.50	0.103	0.103	9.71	9.71	-38.0	-40.0	-37.9	28.1	26.8	23.1	0.17
910203	1300	0.47	0.103	0.103	9.71	9.71	-28.0	-38.0	-32.2	20.0	19.0	14.8	0.19
910203	1900	0.53	0.103	0.103	9.71	9.71	-30.0	-34.0	-32.9	18.8	17.4	17.7	0.19
910204	0100	0.47	0.103	0.103	9.71	9.71	-32.0	-32.0	-32.7	18.4	16.5	18.1	0.21
910204	0700	0.44	0.103	0.103	9.71	9.71	-30.0	-34.0	-32.4	17.2	16.4	14.4	0.18
910204	1300	0.40	0.113	0.103	8.87	9.71	-32.0	-30.0	-29.8	18.6	17.1	14.3	0.22
910204	1900	0.43	0.113	0.113	8.87	8.87	-32.0	-32.0	-31.5	19.5	17.7	17.3	0.21
910205	0100	0.42	0.113	0.103	8.87	9.71	-32.0	-32.0	-32.7	19.5	17.4	15.6	0.22
910205	0700	0.44	0.123	0.113	8.16	8.87	-34.0	-32.0	-32.4	17.7	16.4	14.6	0.20
910205	1300	0.48	0.123	0.113	8.16	8.87	-32.0	-32.0	-35.2	26.2	24.9	24.7	0.24
910205	1900	0.53	0.113	0.113	8.87	8.87	-30.0	-30.0	-32.6	21.5	21.1	19.1	0.19
910206	0100	0.59	0.103	0.103	9.71	9.71	-34.0	-38.0	-34.7	19.8	19.8	16.8	0.22
910206	0700	0.62	0.113	0.113	8.87	8.87	-30.0	-26.0	-27.2	17.3	18.3	14.2	0.18
910206	1300	0.57	0.113	0.113	8.87	8.87	-30.0	-28.0	-29.7	17.4	17.3	13.3	0.22
910206	1900	0.55	0.113	0.113	8.87	8.87	-28.0	-28.0	-28.0	20.3	19.5	19.3	0.18
910207	0100	0.55	0.123	0.113	8.16	8.87	-36.0	-38.0	-36.6	22.8	21.0	21.9	0.19
910207	0700	0.52	0.123	0.113	8.16	8.87	-40.0	-26.0	-31.1	28.3	26.9	25.4	0.19
910207	1300	0.54	0.123	0.113	8.16	8.87	-28.0	-28.0	-30.6	28.7	28.5	27.5	0.20
910207	1900	0.56	0.123	0.113	8.16	8.87	-38.0	-38.0	-31.2	39.7	39.9	27.6	0.19
910208	0100	0.70	0.113	0.113	8.87	8.87	-40.0	24.0	4.6	55.4	37.9	22.7	0.19
910208	0700	1.80	0.181	0.162	5.52	6.19	40.0	38.0	35.1	21.9	19.6	16.8	0.17
910208	1000	1.95	0.152	0.162	6.59	6.19	20.0	38.0	28.1	21.4	18.9	16.2	0.17
910208	1300	2.03	0.152	0.152	6.59	6.59	26.0	34.0	29.2	21.9	19.1	14.9	0.18
910208	1900	1.58	0.142	0.132	7.04	7.56	20.0	24.0	23.5	25.6	21.5	19.5	0.14
910209	0100	1.35	0.113	0.113	8.87	8.87	14.0	16.0	20.5	29.0	25.3	22.9	0.15
910209	0700	1.16	0.113	0.113	8.87	8.87	-2.0	0.0	10.6	27.2	25.5	20.1	0.15
910209	1300	1.31	0.113	0.113	8.87	8.87	-8.0	50.0	20.5	40.0	20.6	21.0	0.17
910209	1900	0.95	0.123	0.123	8.16	8.16	-4.0	12.0	15.4	33.2	25.4	21.5	0.15
910210	0100	0.74	0.123	0.123	8.16	8.16	-4.0	-8.0	10.6	34.3	30.9	27.3	0.17
910210	0700	0.72	0.113	0.113	8.87	8.87	2.0	2.0	10.2	36.0	29.4	31.6	0.18
910210	1300	0.83	0.123	0.123	8.16	8.16	8.0	10.0	17.8	43.1	27.5	33.4	0.16
910210	1900	0.63	0.210	0.113	4.75	8.87	40.0	40.0	14.7	43.5	24.8	26.0	0.21
910211	0100	0.54	0.201	0.113	4.98	8.87	38.0	4.0	14.4	39.6	24.8	23.5	0.20
910211	0700	0.55	0.113	0.113	8.87	8.87	-6.0	-10.0	5.8	36.2	26.8	23.0	0.17
910211	1300	0.76	0.259	0.240	3.86	4.17	48.0	22.0	22.6	41.1	23.3	22.4	0.12
910211	1600	0.76	0.201	0.210	4.98	4.75	20.0	22.0	19.8	38.6	23.0	16.8	0.14
910211	1900	0.58	0.152	0.152	6.59	6.59	-12.0	-12.0	15.7	40.0	26.0	22.4	0.18
910211	2200	0.65	0.289	0.289	3.47	3.47	36.0	36.0	20.3	36.8	20.6	12.7	0.16
910212	0100	1.01	0.210	0.210	4.75	4.75	44.0	44.0	38.1	24.1	19.0	15.2	0.18
910212	0400	1.49	0.171	0.181	5.83	5.52	32.0	36.0	38.5	21.1	16.5	15.6	0.19
910212	0700	1.61	0.152	0.152	6.59	6.59	34.0	36.0	35.4	20.7	16.1	13.0	0.19
910212	1000	1.35	0.181	0.152	5.52	6.59	38.0	36.0	30.3	19.3	15.3	17.9	0.16
910212	1300	1.14	0.162	0.162	6.19	6.19	26.0	24.0	29.5	20.7	17.7	13.2	0.15

(Sheet 19 of 37)

Table A1 (Continued)

Date	Time EST	$H_m$ m	$f_{p,FD}$ Hz	$f_{p,FS}$ Hz	$T_{p,FD}$ sec	$T_{p,FS}$ sec	$\theta_{p,FD}$ deg	$\theta_{p,DS}$ deg	$\theta_{p,SW}$ deg	$\Delta\theta_{DS}$ deg	$\Delta\theta_{SW}$ deg	$\Delta\theta_{DP}$ deg	$\chi$
910212	1600	1.02	0.152	0.152	6.59	6.59	24.0	22.0	25.0	22.2	18.8	13.0	0.16
910212	1900	0.93	0.142	0.142	7.04	7.04	24.0	16.0	23.9	24.6	20.0	15.6	0.16
910212	2200	0.79	0.132	0.113	7.56	8.87	10.0	10.0	18.2	25.4	19.2	14.8	0.15
910213	0100	0.68	0.123	0.123	8.16	8.16	6.0	8.0	12.6	28.3	24.1	13.2	0.16
910213	0400	0.60	0.142	0.132	7.04	7.56	10.0	-12.0	-12.0	33.3	25.4	18.5	0.22
910213	0700	0.52	0.103	0.103	9.71	9.71	-14.0	-10.0	-16.5	37.7	20.7	12.3	0.22
910213	1000	0.42	0.240	0.132	4.17	7.56	-52.0	-54.0	-19.7	48.6	18.7	21.1	0.19
910213	1300	0.35	0.220	0.103	4.54	9.71	-50.0	-48.0	-31.0	41.9	23.5	21.6	0.19
910213	1600	0.31	0.171	0.103	5.83	9.71	-44.0	-52.0	-35.8	37.7	22.4	32.0	0.20
910213	1900	0.29	0.162	0.113	6.19	8.87	-46.0	-46.0	-36.2	38.1	24.4	26.1	0.20
910213	2200	0.31	0.152	0.113	6.59	8.87	-42.0	-42.0	-36.3	33.0	24.6	33.6	0.19
910214	0100	0.43	0.132	0.123	7.56	8.16	-38.0	-38.0	-38.6	23.2	19.1	20.0	0.17
910214	0400	0.60	0.123	0.113	8.16	8.87	-38.0	-40.0	-41.3	16.9	14.5	17.1	0.21
910214	0700	0.66	0.123	0.093	8.16	10.72	-38.0	-36.0	-42.1	17.3	12.0	12.1	0.21
910214	1000	0.65	0.083	0.083	11.98	11.98	-34.0	-34.0	-39.6	18.6	12.8	11.0	0.21
910214	1300	0.67	0.083	0.083	11.98	11.98	-30.0	-30.0	-35.4	17.8	14.4	13.9	0.18
910214	1600	0.66	0.093	0.083	10.72	11.98	-30.0	-30.0	-35.6	19.0	16.9	19.6	0.20
910214	1900	0.65	0.093	0.093	10.72	10.72	-34.0	-34.0	-38.9	21.5	21.7	19.8	0.20
910214	2200	0.62	0.103	0.093	9.71	10.72	-30.0	-32.0	-37.0	26.2	28.5	21.8	0.19
910215	0100	0.56	0.103	0.093	9.71	10.72	-34.0	-30.0	-28.6	23.6	25.2	18.0	0.16
910215	0400	0.49	0.083	0.083	11.98	11.98	-30.0	-32.0	-29.9	25.3	26.0	16.5	0.22
910215	0700	0.44	0.083	0.083	11.98	11.98	-34.0	-34.0	-30.1	25.1	26.6	14.3	0.22
910215	1000	0.42	0.093	0.093	10.72	10.72	-32.0	-32.0	-10.9	47.6	27.6	19.7	0.26
910215	1300	0.44	0.093	0.093	10.72	10.72	-34.0	-32.0	-2.3	83.8	23.7	22.1	0.21
910215	1600	0.61	0.210	0.093	4.75	10.72	60.0	62.0	33.8	88.0	18.3	25.2	0.20
910215	1900	0.81	0.210	0.210	4.75	4.75	58.0	60.0	45.1	18.3	13.2	7.0	0.20
910215	2200	0.91	0.201	0.201	4.98	4.98	52.0	54.0	46.3	13.6	10.5	5.3	0.20
910216	0100	0.91	0.191	0.201	5.24	4.98	50.0	50.0	43.9	15.9	11.2	6.5	0.16
910216	0400	0.92	0.201	0.181	4.98	5.52	52.0	50.0	42.4	21.3	14.7	8.6	0.15
910216	0700	0.93	0.171	0.171	5.83	5.83	44.0	56.0	43.9	27.0	14.3	7.1	0.17
910216	1000	0.95	0.191	0.191	5.24	5.24	50.0	48.0	44.1	23.8	13.3	7.4	0.18
910216	1300	0.77	0.181	0.181	5.52	5.52	46.0	48.0	42.1	27.9	15.1	7.7	0.14
910216	1600	0.68	0.181	0.201	5.52	4.98	46.0	48.0	40.5	40.6	19.1	12.3	0.16
910216	1900	0.65	0.162	0.162	6.19	6.19	38.0	52.0	44.3	39.5	20.9	9.7	0.18
910216	2200	0.51	0.191	0.191	5.24	5.24	50.0	52.0	29.0	52.6	21.3	9.3	0.20
910217	0100	0.39	0.074	0.083	13.56	11.98	-6.0	-8.0	13.6	51.3	26.9	27.9	0.17
910217	0400	0.35	0.083	0.083	11.98	11.98	-4.0	-4.0	-6.0	34.0	31.6	24.3	0.21
910217	0700	0.30	0.093	0.083	10.72	11.98	-8.0	-10.0	-17.1	32.8	33.7	27.1	0.25
910217	1000	0.27	0.083	0.083	11.98	11.98	-10.0	-12.0	-19.9	31.4	27.3	26.7	0.25
910217	1300	0.29	0.093	0.093	10.72	10.72	-16.0	-10.0	-24.1	34.4	19.8	19.6	0.23
910217	1600	0.31	0.318	0.093	3.15	10.72	-54.0	-52.0	-28.3	40.9	17.9	23.6	0.26
910217	1900	0.32	0.298	0.074	3.35	13.56	-54.0	-54.0	-32.8	40.1	16.8	20.4	0.27
910217	2200	0.32	0.181	0.083	5.52	11.98	-48.0	-48.0	-32.5	37.2	16.3	27.1	0.21
910218	0100	0.31	0.191	0.093	5.24	10.72	-46.0	-46.0	-30.3	37.9	20.9	26.3	0.20
910218	0400	0.31	0.064	0.083	15.63	11.98	-12.0	-14.0	-21.0	39.3	25.5	28.0	0.22
910218	0700	0.30	0.083	0.083	11.98	11.98	-6.0	-42.0	-26.3	37.1	26.6	25.6	0.26
910218	1000	0.30	0.083	0.083	11.98	11.98	-2.0	-12.0	-21.3	35.6	26.9	24.6	0.23
910218	1300	0.31	0.074	0.074	13.56	13.56	-10.0	-12.0	-23.4	32.9	33.0	24.0	0.20
910218	1600	0.33	0.074	0.074	13.56	13.56	-12.0	-16.0	-24.7	29.4	31.3	22.9	0.23
910218	1900	0.36	0.074	0.083	13.56	11.98	-10.0	-12.0	-24.3	34.1	30.5	28.0	0.22
910218	2200	0.38	0.083	0.083	11.98	11.98	-18.0	-14.0	-23.7	34.9	30.0	27.0	0.19
910219	0100	0.37	0.162	0.074	6.19	13.56	-42.0	-12.0	-22.9	38.3	28.4	27.5	0.18
910219	0400	0.39	0.083	0.083	11.98	11.98	-4.0	-46.0	-28.1	36.1	26.2	30.3	0.15
910219	0700	0.49	0.162	0.171	6.19	5.83	-44.0	-44.0	-37.2	29.9	19.8	14.1	0.14
910219	1300	0.44	0.171	0.083	5.83	11.98	-48.0	-46.0	-39.8	32.5	18.3	28.2	0.15
910219	1900	0.45	0.171	0.171	5.83	5.83	-46.0	-48.0	-41.2	31.0	18.6	12.6	0.16
910220	0100	0.43	0.181	0.181	5.52	5.52	-48.0	-48.0	-40.0	30.0	18.2	11.4	0.16

(Sheet 20 of 37)

Table A1 (Continued)

Date	Time EST	H <sub>m</sub> m	f <sub>p,FD</sub> Hz	f <sub>p,FS</sub> Hz	T <sub>p,FD</sub> sec	T <sub>p,FS</sub> sec	θ <sub>p,FD</sub> deg	θ <sub>p,DS</sub> deg	θ <sub>p,SW</sub> deg	Δθ <sub>DS</sub> deg	Δθ <sub>SW</sub> deg	Δθ <sub>DP</sub> deg	x
910220	0700	0.45	0.171	0.152	5.83	6.59	-44.0	-44.0	-39.8	20.4	14.3	14.2	0.16
910220	1300	0.40	0.142	0.142	7.04	7.04	-42.0	-46.0	-42.3	22.9	14.8	16.3	0.16
910220	1900	0.41	0.142	0.152	7.04	6.59	-42.0	-42.0	-46.2	28.6	15.5	17.0	0.14
910221	0100	0.38	0.142	0.142	7.04	7.04	-44.0	-46.0	-44.8	25.6	21.4	6.1	0.16
910221	0700	0.62	0.152	0.152	6.59	6.59	-44.0	4.0	-3.6	32.7	28.5	49.6	0.11
910221	1300	0.71	0.152	0.152	6.59	6.59	16.0	16.0	10.2	36.8	30.3	25.9	0.12
910221	1900	0.61	0.142	0.113	7.04	8.87	-40.0	-40.0	0.3	46.9	35.4	21.9	0.12
910222	0100	0.67	0.162	0.113	6.19	8.87	16.0	-30.0	-6.0	42.5	37.5	23.5	0.16
910222	0700	0.56	0.113	0.113	8.87	8.87	-40.0	-38.0	-19.8	33.5	36.1	27.8	0.13
910222	1300	0.45	0.103	0.103	9.71	9.71	-28.0	-28.0	-31.2	28.3	31.1	21.6	0.21
910222	1600	0.40	0.113	0.113	8.87	8.87	-28.0	-28.0	-33.1	26.0	26.7	21.9	0.20
910222	1900	0.36	0.103	0.113	9.71	8.87	-30.0	-28.0	-31.8	26.3	26.7	25.5	0.17
910222	2200	0.34	0.113	0.103	8.87	9.71	-32.0	-32.0	-34.9	26.9	28.2	21.2	0.19
910223	0100	1.13	0.279	0.240	3.59	4.17	56.0	56.0	47.8	23.5	19.4	17.9	0.26
910223	0400	2.10	0.171	0.162	5.83	6.19	44.0	44.0	38.6	27.7	25.1	20.6	0.17
910223	0700	2.27	0.152	0.142	6.59	7.04	26.0	26.0	31.7	22.7	21.8	17.3	0.16
910223	1000	1.96	0.152	0.152	6.59	6.59	18.0	18.0	31.0	24.4	22.5	16.9	0.15
910223	1300	2.14	0.152	0.152	6.59	6.59	26.0	28.0	32.1	23.6	21.1	16.8	0.17
910223	1600	2.34	0.142	0.142	7.04	7.04	22.0	22.0	28.0	25.9	22.2	15.4	0.16
910223	1900	2.39	0.142	0.142	7.04	7.04	20.0	16.0	23.9	23.6	22.5	15.3	0.15
910223	2200	2.05	0.142	0.142	7.04	7.04	20.0	20.0	27.2	25.8	24.8	17.9	0.14
910224	0100	1.63	0.123	0.152	8.16	6.59	2.0	14.0	26.1	35.6	34.0	29.6	0.14
910224	0400	1.50	0.132	0.132	7.56	7.56	6.0	20.0	20.3	35.8	32.5	19.2	0.12
910224	0700	1.39	0.142	0.162	7.04	6.19	14.0	12.0	15.1	36.5	32.9	29.0	0.11
910224	1000	1.47	0.132	0.132	7.56	7.56	6.0	6.0	9.2	35.3	32.6	25.9	0.10
910224	1300	1.49	0.132	0.132	7.56	7.56	0.0	6.0	15.7	41.1	34.0	29.0	0.12
910224	1600	1.80	0.123	0.123	8.16	8.16	-24.0	-20.0	6.9	51.5	30.2	30.1	0.15
910224	1900	1.90	0.113	0.113	8.87	8.87	-26.0	-24.0	-1.1	41.7	31.7	28.5	0.11
910224	2200	1.87	0.113	0.113	8.87	8.87	-22.0	4.0	-0.6	35.6	32.3	30.6	0.10
910225	0100	1.71	0.113	0.113	8.87	8.87	-18.0	4.0	-3.2	35.5	30.8	27.4	0.11
910225	0400	1.49	0.113	0.113	8.87	8.87	-12.0	-12.0	3.1	35.9	28.4	24.5	0.12
910225	0700	1.30	0.113	0.113	8.87	8.87	-14.0	8.0	3.9	34.8	27.1	26.6	0.13
910225	1000	1.28	0.113	0.123	8.87	8.16	-12.0	10.0	10.1	36.2	25.0	25.5	0.11
910225	1300	1.29	0.142	0.123	7.04	8.16	14.0	6.0	14.7	29.3	21.5	22.1	0.15
910225	1600	1.24	0.132	0.132	7.56	7.56	12.0	14.0	16.3	25.8	22.2	20.8	0.15
910225	1900	1.14	0.132	0.132	7.56	7.56	10.0	10.0	12.8	23.0	21.7	20.0	0.15
910225	2200	1.12	0.132	0.132	7.56	7.56	2.0	4.0	8.2	22.7	22.5	21.7	0.10
910226	0100	1.09	0.152	0.132	6.59	7.56	6.0	6.0	11.2	24.0	24.3	21.1	0.13
910226	0400	1.18	0.308	0.142	3.25	7.04	52.0	2.0	26.3	37.1	22.6	16.3	0.20
910226	0700	1.58	0.191	0.191	5.24	5.24	42.0	42.0	31.3	32.0	19.8	17.0	0.17
910226	1000	1.50	0.152	0.152	6.59	6.59	14.0	14.0	25.1	27.5	18.9	14.7	0.13
910226	1300	1.45	0.162	0.162	6.19	6.19	22.0	22.0	25.7	27.9	18.2	14.4	0.15
910226	1600	1.25	0.152	0.162	6.59	6.19	20.0	28.0	28.9	28.5	17.8	16.1	0.19
910226	1900	1.04	0.152	0.132	6.59	7.56	16.0	16.0	24.6	27.9	18.0	18.7	0.17
910226	2200	0.85	0.123	0.123	8.16	8.16	2.0	20.0	21.1	25.7	16.7	17.2	0.13
910227	0100	0.77	0.132	0.132	7.56	7.56	10.0	12.0	17.2	24.5	15.8	12.7	0.16
910227	0400	0.83	0.132	0.132	7.56	7.56	4.0	28.0	23.3	25.8	15.6	15.2	0.19
910227	0700	0.81	0.123	0.123	8.16	8.16	8.0	14.0	21.7	26.7	15.3	12.0	0.20
910227	1000	0.69	0.123	0.123	8.16	8.16	12.0	12.0	21.8	26.4	14.0	14.4	0.16
910227	1300	0.57	0.132	0.123	7.56	8.16	12.0	16.0	17.2	26.6	15.6	18.5	0.18
910227	1600	0.48	0.113	0.113	8.87	8.87	2.0	10.0	15.8	28.5	17.6	14.6	0.21
910227	1900	0.43	0.123	0.113	8.16	8.87	8.0	28.0	16.3	27.9	18.5	18.9	0.23
910227	2200	0.38	0.113	0.113	8.87	8.87	16.0	16.0	9.5	26.5	30.8	19.4	0.21
910228	0100	0.39	0.113	0.113	8.87	8.87	2.0	2.0	-20.1	66.2	22.0	19.9	0.21
910228	0400	0.36	0.113	0.103	8.87	9.71	8.0	-64.0	-22.9	65.3	21.6	21.2	0.24
910228	0700	0.33	0.103	0.103	9.71	9.71	14.0	12.0	-18.4	58.1	23.3	21.5	0.21
910228	1000	0.32	0.103	0.103	9.71	9.71	8.0	4.0	-8.4	46.7	24.1	22.5	0.25

(Sheet 21 of 37)

Table A1 (Continued)

Date	Time EST	H <sub>ms</sub> m	f <sub>p,FD</sub> Hz	f <sub>p,FS</sub> Hz	T <sub>p,FD</sub> sec	T <sub>p,FS</sub> sec	θ <sub>p,FD</sub> deg	θ <sub>p,DS</sub> deg	θ <sub>p,SW</sub> deg	Δθ <sub>DS</sub> deg	Δθ <sub>SW</sub> deg	Δθ <sub>DP</sub> deg	χ
910228	1300	0.37	0.103	0.103	9.71	9.71	16.0	4.0	-2.1	30.5	24.5	23.2	0.21
910228	1600	0.49	0.093	0.103	10.72	9.71	6.0	6.0	-7.3	43.1	23.3	21.8	0.21
910228	1900	0.50	0.093	0.093	10.72	10.72	-6.0	-2.0	-6.5	27.6	27.8	22.0	0.23
910228	2200	0.49	0.093	0.093	10.72	10.72	4.0	4.0	-5.6	27.5	26.1	21.1	0.23
910301	0100	0.47	0.093	0.093	10.72	10.72	4.0	0.0	-5.5	29.8	27.2	23.3	0.16
910301	0400	0.64	0.162	0.093	6.19	10.72	-46.0	-46.0	-30.0	39.9	21.5	27.6	0.15
910301	0700	0.63	0.181	0.093	5.52	10.72	-50.0	-50.0	-29.1	43.9	22.0	30.2	0.16
910301	1000	0.63	0.093	0.093	10.72	10.72	-14.0	-46.0	-29.2	42.5	25.5	27.8	0.16
910301	1300	0.62	0.103	0.103	9.71	9.71	-2.0	-40.0	-23.8	39.7	25.2	23.7	0.13
910301	1600	0.65	0.103	0.103	9.71	9.71	12.0	-42.0	-23.7	41.1	26.1	25.8	0.16
910301	1900	0.63	0.171	0.103	5.83	9.71	-48.0	-48.0	-31.6	37.8	28.4	39.4	0.16
910301	2200	0.77	0.162	0.162	6.19	6.19	-44.0	-46.0	-34.3	27.9	20.6	10.1	0.14
910302	0100	1.09	0.142	0.142	7.04	7.04	-40.0	-40.0	-37.3	18.1	18.2	11.0	0.11
910302	0400	1.19	0.132	0.132	7.56	7.56	-40.0	-42.0	-41.0	20.2	19.6	12.7	0.16
910302	0700	1.30	0.123	0.123	8.16	8.16	-32.0	-34.0	-38.7	18.0	18.2	14.8	0.13
910302	1000	1.26	0.103	0.113	9.71	8.87	-30.0	-40.0	-36.3	20.2	20.2	22.4	0.11
910302	1300	1.23	0.113	0.113	8.87	8.87	-38.0	-38.0	-35.1	20.0	19.6	19.3	0.10
910302	1600	1.20	0.113	0.113	8.87	8.87	-38.0	-40.0	-40.6	23.5	22.7	23.5	0.11
910302	1900	1.03	0.103	0.113	9.71	8.87	-30.0	-42.0	-36.9	25.3	24.6	27.7	0.12
910302	2200	0.99	0.113	0.113	8.87	8.87	-40.0	-26.0	-36.3	27.4	26.8	24.9	0.11
910303	0100	0.95	0.113	0.113	8.87	8.87	-30.0	-26.0	-33.9	25.3	25.1	19.8	0.09
910303	0400	0.99	0.113	0.113	8.87	8.87	-26.0	-26.0	-31.7	24.1	23.7	19.8	0.10
910303	0700	1.00	0.113	0.113	8.87	8.87	-26.0	-28.0	-33.7	25.3	24.6	23.0	0.13
910303	1000	0.88	0.113	0.113	8.87	8.87	-26.0	-42.0	-34.4	31.5	28.2	31.0	0.13
910303	1300	0.89	0.113	0.113	8.87	8.87	-10.0	-40.0	-29.4	31.9	26.1	26.5	0.12
910303	1600	1.05	0.113	0.113	8.87	8.87	-36.0	-38.0	-37.6	30.4	25.4	29.7	0.12
910303	1900	1.28	0.113	0.113	8.87	8.87	-40.0	-42.0	-42.0	28.2	27.1	30.1	0.12
910303	2200	1.24	0.123	0.113	8.16	8.87	-38.0	-42.0	-41.3	28.4	27.9	29.7	0.14
910304	0100	1.29	0.123	0.103	8.16	9.71	-36.0	-40.0	-39.8	25.4	21.9	27.0	0.14
910304	0400	1.30	0.132	0.093	7.56	10.72	-40.0	-40.0	-36.9	22.8	21.3	27.5	0.13
910304	0700	1.23	0.152	0.093	6.59	10.72	-42.0	-42.0	-38.5	23.1	21.6	29.0	0.15
910304	1000	1.12	0.093	0.093	10.72	10.72	-32.0	-42.0	-38.8	26.0	22.5	28.7	0.15
910304	1300	1.20	0.093	0.093	10.72	10.72	-26.0	-28.0	-33.3	19.6	18.3	12.3	0.11
910304	1600	1.26	0.093	0.093	10.72	10.72	-28.0	-28.0	-31.9	13.0	15.1	6.9	0.11
910304	1900	1.16	0.093	0.093	10.72	10.72	-40.0	-32.0	-36.5	23.1	23.1	23.6	0.17
910304	2200	1.12	0.093	0.093	10.72	10.72	-28.0	-28.0	-32.2	24.2	23.8	23.7	0.19
910305	0100	1.10	0.093	0.093	10.72	10.72	-26.0	-28.0	-30.3	26.7	26.8	25.1	0.16
910305	0400	1.06	0.093	0.093	10.72	10.72	-26.0	-28.0	-25.3	35.1	30.6	33.1	0.12
910305	0700	1.08	0.093	0.093	10.72	10.72	-26.0	-30.0	-12.7	50.5	31.9	33.8	0.12
910306	1000	0.83	0.103	0.103	9.71	9.71	-36.0	-36.0	-30.4	32.4	31.7	30.8	0.16
910306	1300	0.81	0.103	0.103	9.71	9.71	-38.0	-24.0	-30.1	33.3	30.9	28.8	0.16
910306	1600	0.82	0.093	0.103	10.72	9.71	-32.0	-22.0	-26.1	33.2	31.7	36.6	0.14
910306	1900	0.90	0.103	0.103	9.71	9.71	-38.0	-36.0	-37.5	33.4	25.9	30.2	0.22
910306	2200	0.89	0.103	0.103	9.71	9.71	-22.0	-40.0	-31.4	30.7	23.0	24.3	0.20
910307	0100	0.84	0.093	0.093	10.72	10.72	-36.0	-40.0	-34.5	30.7	22.5	31.4	0.21
910307	0400	0.80	0.093	0.093	10.72	10.72	-36.0	-40.0	-35.8	30.7	23.5	37.0	0.16
910307	0700	0.70	0.093	0.093	10.72	10.72	-38.0	-40.0	-40.3	31.6	22.8	32.5	0.16
910307	1000	0.63	0.103	0.093	9.71	10.72	-38.0	-42.0	-36.9	34.4	27.9	31.9	0.20
910307	1300	0.54	0.113	0.093	8.87	10.72	-38.0	-42.0	-33.6	42.9	34.2	37.5	0.22
910307	1600	0.54	0.103	0.103	9.71	9.71	-16.0	-30.0	-21.2	42.2	33.3	33.8	0.18
910307	1900	0.53	0.103	0.103	9.71	9.71	10.0	-40.0	1.5	49.0	33.0	39.9	0.18
910307	2200	0.55	0.093	0.103	10.72	9.71	-20.0	-42.0	-28.5	48.5	39.6	44.9	0.18
910308	0100	0.81	0.250	0.269	4.01	3.72	50.0	50.0	22.7	56.3	32.0	26.6	0.12
910308	0400	0.99	0.230	0.220	4.35	4.54	54.0	54.0	39.6	40.8	24.2	20.7	0.15
910308	0700	1.02	0.191	0.191	5.24	5.24	36.0	44.0	33.0	35.6	26.8	17.5	0.13
910308	1000	0.99	0.181	0.181	5.52	5.52	38.0	38.0	33.5	31.6	25.5	17.0	0.15
910308	1300	0.97	0.171	0.191	5.83	5.24	36.0	38.0	36.3	34.6	23.8	19.7	0.17

(Sheet 22 of 37)

Table A1 (Continued)

Date	Time EST	H <sub>m</sub> m	f <sub>p,JD</sub> Hz	f <sub>p,JS</sub> Hz	T <sub>p,JD</sub> sec	T <sub>p,JS</sub> sec	θ <sub>p,JD</sub> deg	θ <sub>p,JS</sub> deg	θ <sub>p,SW</sub> deg	Δθ <sub>DS</sub> deg	Δθ <sub>SW</sub> deg	Δθ <sub>DDP</sub> deg	X
910308	1600	0.92	0.171	0.201	5.83	4.98	32.0	54.0	33.7	38.7	25.3	17.0	0.13
910308	1900	0.74	0.191	0.191	5.24	5.24	40.0	40.0	22.5	35.5	19.4	8.9	0.15
910308	2200	0.72	0.191	0.191	5.24	5.24	40.0	42.0	22.8	35.8	22.4	12.1	0.16
910309	0100	0.75	0.210	0.201	4.75	4.98	44.0	42.0	23.9	32.4	21.8	15.4	0.16
910309	0400	1.01	0.152	0.191	6.59	5.24	16.0	42.0	26.1	27.6	18.5	16.7	0.16
910309	0700	1.13	0.142	0.162	7.04	6.19	16.0	28.0	25.2	22.4	18.9	15.0	0.13
910309	1000	1.07	0.152	0.171	6.59	5.83	20.0	40.0	27.6	24.7	20.9	19.7	0.15
910309	1300	0.99	0.132	0.142	7.56	7.04	8.0	40.0	26.3	24.5	19.7	18.0	0.17
910309	1600	0.99	0.132	0.132	7.56	7.56	8.0	22.0	24.8	24.1	19.8	16.2	0.15
910309	1900	0.88	0.132	0.132	7.56	7.56	16.0	18.0	24.3	25.9	22.1	16.9	0.15
910309	2200	0.81	0.132	0.132	7.56	7.56	20.0	20.0	24.0	26.1	22.8	17.1	0.15
910310	0100	0.78	0.132	0.142	7.56	7.04	10.0	14.0	18.5	25.7	22.9	15.7	0.15
910310	0400	0.96	0.142	0.142	7.04	7.04	18.0	18.0	20.3	24.8	20.9	15.1	0.12
910310	0700	1.14	0.162	0.181	6.19	5.52	16.0	16.0	20.1	21.4	19.0	14.2	0.12
910310	1000	1.13	0.152	0.152	6.59	6.59	14.0	18.0	18.3	22.9	18.5	13.1	0.12
910310	1300	1.20	0.152	0.152	6.59	6.59	16.0	18.0	18.8	22.1	18.4	10.0	0.15
910310	1600	1.27	0.152	0.152	6.59	6.59	20.0	24.0	24.5	26.1	17.1	14.7	0.18
910310	1900	1.11	0.142	0.152	7.04	6.59	16.0	18.0	24.3	21.1	16.1	13.3	0.15
910310	2200	1.11	0.142	0.142	7.04	7.04	16.0	36.0	24.9	20.0	14.1	11.8	0.16
910311	0100	1.15	0.171	0.162	5.83	6.19	38.0	40.0	29.8	20.1	12.8	12.4	0.22
910311	0400	1.29	0.171	0.142	5.83	7.04	40.0	40.0	31.2	20.4	13.3	10.9	0.21
910311	0700	1.38	0.162	0.152	6.19	6.59	36.0	36.0	30.0	20.5	14.0	13.2	0.17
910311	1300	1.59	0.142	0.142	7.04	7.04	28.0	26.0	27.1	22.3	17.0	13.4	0.18
910311	1900	1.32	0.142	0.142	7.04	7.04	20.0	22.0	25.4	23.3	17.0	13.9	0.17
910312	0100	1.41	0.142	0.152	7.04	6.59	20.0	32.0	31.2	25.1	16.3	14.0	0.19
910312	0700	1.26	0.123	0.123	8.16	8.16	10.0	22.0	26.8	23.5	16.3	15.5	0.19
910312	1300	1.10	0.123	0.123	8.16	8.16	10.0	10.0	21.0	23.9	18.8	11.4	0.17
910312	1900	0.94	0.132	0.093	7.56	10.72	8.0	12.0	15.2	24.1	19.4	22.7	0.17
910313	0100	0.86	0.132	0.103	7.56	9.71	10.0	12.0	10.7	24.1	21.5	20.1	0.19
910313	0700	1.00	0.074	0.074	13.56	13.56	-8.0	14.0	3.0	25.5	23.7	25.7	0.17
910313	1300	1.15	0.074	0.074	13.56	13.56	0	-12.0	-8.7	27.4	25.6	17.3	0.14
910313	1900	1.15	0.074	0.083	13.56	11.98	0	-12.0	-17.4	32.3	27.9	23.4	0.13
910314	0100	1.02	0.074	0.083	13.56	11.98	-12.0	-12.0	-5.6	38.3	39.6	28.9	0.12
910314	0700	1.28	0.132	0.132	7.56	7.56	16.0	16.0	14.3	34.1	26.9	16.9	0.15
910314	1300	0.99	0.132	0.123	7.56	8.16	14.0	10.0	11.2	41.0	26.6	38.1	0.14
910314	1900	0.97	0.113	0.113	8.87	8.87	12.0	34.0	24.7	35.6	23.8	42.3	0.21
910315	1300	1.73	0.103	0.103	9.71	9.71	20.0	18.0	25.8	26.3	19.8	21.9	0.16
910315	1600	1.80	0.103	0.103	9.71	9.71	18.0	10.0	23.7	26.6	19.8	19.4	0.20
910315	1900	1.85	0.093	0.093	10.72	10.72	18.0	18.0	25.9	28.8	20.0	20.2	0.20
910315	2200	1.81	0.093	0.093	10.72	10.72	12.0	14.0	23.9	29.6	21.0	20.3	0.18
910316	0100	1.93	0.083	0.093	11.98	10.72	16.0	16.0	21.3	25.5	21.2	22.6	0.16
910316	0400	1.83	0.093	0.083	10.72	11.98	2.0	18.0	15.4	26.7	22.8	26.5	0.18
910316	0700	1.84	0.083	0.083	11.98	11.98	14.0	14.0	17.4	29.5	23.7	28.2	0.18
910316	1000	1.67	0.083	0.083	11.98	11.98	-4.0	14.0	15.0	28.2	25.4	28.2	0.15
910316	1300	1.60	0.083	0.083	11.98	11.98	2.0	14.0	8.9	27.2	25.2	28.5	0.13
910316	1600	1.50	0.093	0.083	10.72	11.98	0.0	16.0	7.2	27.2	25.4	27.7	0.14
910316	1900	1.53	0.083	0.083	11.98	11.98	-10.0	-10.0	4.9	29.9	25.8	24.7	0.15
910316	2200	1.51	0.083	0.083	11.98	11.98	-10.0	-8.0	-0.3	26.6	24.9	24.9	0.12
910317	0100	1.46	0.083	0.083	11.98	11.98	16.0	-4.0	7.3	26.4	26.1	26.8	0.11
910317	0400	1.34	0.083	0.083	11.98	11.98	-10.0	-10.0	-0.8	25.9	24.9	22.1	0.12
910317	0700	1.34	0.083	0.083	11.98	11.98	-12.0	-10.0	-3.9	27.0	26.4	26.0	0.15
910317	1000	1.38	0.083	0.083	11.98	11.98	-10.0	-10.0	-4.2	25.2	25.5	23.5	0.13
910317	1300	1.42	0.074	0.074	13.56	13.56	-8.0	-6.0	-0.2	25.3	25.3	24.8	0.11
910317	1600	1.50	0.074	0.074	13.56	13.56	-12.0	-12.0	-5.7	22.8	22.4	19.1	0.12
910317	1900	1.35	0.074	0.074	13.56	13.56	-12.0	-12.0	-5.2	26.7	26.3	26.9	0.17
910317	2200	1.37	0.074	0.083	13.56	11.98	-10.0	-10.0	1.5	26.5	26.5	29.1	0.14

(Sheet 23 of 37)

Table A1 (Continued)

Date	Time EST	H <sub>m</sub> m	f <sub>p,FD</sub> Hz	f <sub>p,FS</sub> Hz	T <sub>p,FD</sub> sec	T <sub>p,FS</sub> sec	θ <sub>p,FD</sub> deg	θ <sub>p,FS</sub> deg	θ <sub>p,SW</sub> deg	Δθ <sub>DS</sub> deg	Δθ <sub>SW</sub> deg	Δθ <sub>FWP</sub> deg	X
910318	0100	1.36	0.074	0.083	13.56	11.98	-8.0	-8.0	-4.5	24.1	24.1	24.4	0.12
910318	0400	1.36	0.083	0.083	11.98	11.98	-10.0	-8.0	-9.9	25.3	25.6	26.5	0.12
910318	0700	1.38	0.083	0.083	11.98	11.98	-12.0	-12.0	-10.8	26.9	26.7	26.1	0.13
910318	1300	1.49	0.083	0.083	11.98	11.98	-14.0	-16.0	-26.9	31.3	26.3	23.5	0.10
910318	1900	1.61	0.083	0.083	11.98	11.98	-14.0	-18.0	-26.1	32.8	27.8	23.3	0.13
910319	0100	1.25	0.093	0.083	10.72	11.98	-6.0	-40.0	-24.0	36.4	32.1	29.5	0.11
910319	0700	1.07	0.103	0.103	9.71	9.71	-40.0	-40.0	-23.3	38.7	34.7	40.9	0.14
910319	1300	1.05	0.074	0.083	13.56	11.98	-10.0	52.0	0.9	57.1	25.9	27.4	0.17
910319	1900	0.87	0.093	0.093	10.72	10.72	-40.0	52.0	-0.6	62.1	28.3	36.4	0.16
910320	0100	0.64	0.083	0.083	11.98	11.98	-14.0	-8.0	-2.6	41.6	26.8	28.0	0.17
910320	0700	0.52	0.083	0.083	11.98	11.98	-14.0	-12.0	0.0	37.9	30.6	29.7	0.19
910320	1300	0.46	0.083	0.083	11.98	11.98	-12.0	-10.0	-6.9	32.9	30.8	30.0	0.22
910320	1900	0.51	0.074	0.083	13.56	11.98	-10.0	-8.0	-7.8	31.9	31.2	26.8	0.21
910321	0100	0.53	0.074	0.083	13.56	11.98	-4.0	-10.0	-2.1	31.5	32.0	28.7	0.27
910321	0700	0.56	0.074	0.074	13.56	13.56	-8.0	-8.0	-11.1	30.9	30.0	23.6	0.27
910321	1300	0.56	0.064	0.074	15.63	13.56	-10.0	-10.0	-9.8	29.5	29.8	29.1	0.19
910321	1900	0.59	0.083	0.083	11.98	11.98	0.0	-8.0	-13.3	31.0	25.6	23.2	0.22
910322	0100	0.50	0.074	0.074	13.56	13.56	-8.0	-10.0	-18.4	29.7	27.4	22.9	0.23
910322	0700	0.47	0.064	0.074	15.63	13.56	-8.0	-8.0	-11.9	33.3	25.9	23.9	0.19
910322	1300	0.51	0.132	0.083	7.56	11.98	-42.0	-42.0	-25.3	42.1	23.9	24.3	0.22
910322	1900	0.48	0.083	0.083	11.98	11.98	-4.0	-8.0	-23.9	38.6	24.7	25.0	0.17
910323	0100	0.51	0.142	0.083	7.04	11.98	-44.0	-44.0	-29.7	47.5	27.9	26.3	0.19
910323	0700	0.65	0.132	0.083	7.56	11.98	-46.0	48.0	7.3	85.4	35.6	22.4	0.15
910323	1300	0.86	0.152	0.132	6.59	7.56	30.0	28.0	19.5	47.8	50.0	24.9	0.16
910323	1900	0.98	0.123	0.113	8.16	8.87	18.0	18.0	-0.1	35.4	40.8	20.3	0.13
910324	0100	0.89	0.103	0.103	9.71	9.71	16.0	16.0	-4.6	49.4	46.1	21.4	0.18
910324	0700	0.85	0.113	0.113	8.87	8.87	10.0	12.0	-6.0	37.4	38.3	18.8	0.14
910324	1300	0.84	0.113	0.113	8.87	8.87	16.0	14.0	-6.1	42.0	32.5	17.2	0.18
910324	1900	0.72	0.123	0.113	8.16	8.87	-44.0	12.0	-22.3	53.3	47.4	26.7	0.13
910325	0100	1.01	0.230	0.230	4.35	4.35	54.0	54.0	34.1	41.3	30.9	24.5	0.16
910325	0700	0.87	0.181	0.162	5.52	6.19	46.0	12.0	23.7	37.2	25.7	23.7	0.11
910325	1300	0.74	0.132	0.132	7.56	7.56	-8.0	12.0	16.6	38.5	25.9	22.6	0.13
910325	1900	0.52	0.103	0.103	9.71	9.71	-8.0	14.0	11.5	32.2	27.3	21.3	0.14
910326	0100	0.51	0.191	0.103	5.24	9.71	14.0	14.0	9.2	33.9	31.7	26.9	0.17
910326	0700	0.46	0.093	0.093	10.72	10.72	14.0	16.0	2.2	32.4	31.1	22.6	0.17
910326	1300	0.62	0.093	0.093	10.72	10.72	-4.0	12.0	5.3	29.7	28.0	26.5	0.18
910326	1900	0.59	0.093	0.093	10.72	10.72	18.0	12.0	13.2	28.5	28.0	26.9	0.20
910327	0100	0.71	0.093	0.093	10.72	10.72	-12.0	-12.0	-4.2	29.5	33.3	27.0	0.18
910327	0700	0.80	0.093	0.093	10.72	10.72	-6.0	-10.0	-8.0	27.2	28.4	25.7	0.21
910327	1300	0.89	0.103	0.093	9.71	10.72	-12.0	-14.0	-16.6	29.0	26.9	27.1	0.14
910327	1900	0.76	0.093	0.093	10.72	10.72	18.0	-12.0	-13.1	35.8	26.4	31.9	0.23
910328	0100	0.71	0.083	0.083	11.98	11.98	-12.0	-12.0	-24.9	40.7	22.1	27.2	0.20
910328	0700	0.67	0.083	0.083	11.98	11.98	-12.0	-60.0	-22.7	41.9	22.3	27.8	0.24
910328	1300	0.58	0.083	0.083	11.98	11.98	-6.0	-40.0	-30.5	39.5	21.1	22.6	0.17
910328	1900	0.54	0.132	0.093	7.56	10.72	-40.0	-40.0	-32.0	38.6	22.6	33.0	0.22
910329	0100	0.51	0.093	0.093	10.72	10.72	-4.0	-40.0	-25.9	39.2	24.1	28.6	0.17
910329	0700	0.54	0.123	0.083	8.16	11.98	-42.0	-42.0	-33.1	42.9	22.2	29.9	0.20
910329	1300	0.78	0.142	0.093	7.04	10.72	-42.0	-58.0	-43.0	25.9	12.2	25.2	0.26
910329	1900	0.81	0.123	0.123	8.16	8.16	-38.0	-60.0	-48.3	21.1	12.1	9.8	0.21
910330	0100	0.75	0.142	0.093	7.04	10.72	-42.0	-42.0	-41.7	27.2	20.8	36.2	0.14
910330	0700	0.86	0.132	0.093	7.56	10.72	-42.0	-46.0	-38.3	29.0	26.9	24.8	0.18
910330	1300	1.80	0.181	0.171	5.52	5.83	36.0	34.0	29.7	24.0	18.5	12.8	0.18
910330	1900	1.57	0.132	0.132	7.56	7.56	12.0	38.0	15.0	30.3	26.3	22.2	0.18

(Sheet 24 of 37)

Table A1 (Continued)

Date	Time EST	H <sub>m</sub> m	f <sub>p,0</sub> Hz	f <sub>p,rs</sub> Hz	T <sub>p,0</sub> sec	T <sub>p,rs</sub> sec	θ <sub>p,0</sub> deg	θ <sub>p,rs</sub> deg	θ <sub>p,mv</sub> deg	Δθ <sub>rs</sub> deg	Δθ <sub>mv</sub> deg	Δθ <sub>for</sub> deg	x
910331	0100	1.11	0.093	0.113	10.72	8.87	-26.0	14.0	7.7	37.5	27.6	35.8	0.11
910331	0700	1.28	0.123	0.123	8.16	8.16	12.0	14.0	20.0	30.3	28.1	22.1	0.13
910331	1300	1.29	0.191	0.113	5.24	8.87	14.0	14.0	19.4	29.8	26.9	38.0	0.11
910331	1900	1.33	0.171	0.171	5.83	5.83	18.0	14.0	20.9	30.4	28.0	16.3	0.14
910401	0100	1.05	0.162	0.123	6.19	8.16	6.0	10.0	17.7	31.1	26.4	38.1	0.11
910401	0700	1.10	0.113	0.123	8.87	8.16	-8.0	10.0	6.3	21.4	19.5	19.1	0.14
910401	1300	0.83	0.113	0.103	8.87	9.71	-4.0	8.0	9.7	23.0	20.8	22.4	0.12
910401	1900	0.71	0.093	0.093	10.72	10.72	0.0	14.0	11.4	25.5	22.2	16.8	0.18
910402	0100	0.71	0.113	0.113	8.87	8.87	-12.0	12.0	1.6	27.1	28.3	22.4	0.15
910402	0700	0.85	0.103	0.103	9.71	9.71	-12.0	12.0	10.1	33.4	28.5	18.9	0.14
910402	1300	0.60	0.113	0.113	8.87	8.87	-14.0	10.0	4.1	29.2	25.3	19.8	0.14
910402	1900	0.61	0.123	0.132	8.16	7.56	-14.0	8.0	4.1	33.2	33.1	34.4	0.14
910403	0100	0.56	0.103	0.103	9.71	9.71	10.0	10.0	-2.0	33.1	29.7	22.4	0.14
910403	0700	0.77	0.123	0.113	8.16	8.87	6.0	4.0	8.7	37.9	30.9	27.9	0.12
910403	1300	0.58	0.103	0.113	9.71	8.87	10.0	4.0	4.4	35.1	29.7	28.4	0.14
910403	1900	0.60	0.113	0.113	8.87	8.87	12.0	-14.0	-1.8	32.8	28.2	25.2	0.13
910404	0100	0.60	0.083	0.113	11.98	8.87	-18.0	-18.0	-4.8	36.8	28.8	33.0	0.13
910404	0700	0.62	0.093	0.093	10.72	10.72	-22.0	-16.0	-4.7	37.9	32.5	22.9	0.13
910404	1300	0.58	0.083	0.093	11.98	10.72	-20.0	-18.0	-7.6	38.6	34.5	34.7	0.13
910404	1900	0.58	0.093	0.093	10.72	10.72	-22.0	-20.0	-20.8	32.7	33.2	32.0	0.14
910405	0100	0.54	0.093	0.093	10.72	10.72	-22.0	-24.0	-26.5	30.7	31.1	31.1	0.17
910405	0700	0.55	0.093	0.093	10.72	10.72	-24.0	-24.0	-28.4	28.7	27.2	29.6	0.15
910405	1300	0.53	0.093	0.093	10.72	10.72	-36.0	-22.0	-33.6	25.1	23.6	25.3	0.17
910405	1900	0.50	0.103	0.093	9.71	10.72	-20.0	-22.0	-28.6	25.0	24.1	30.1	0.16
910406	0100	0.44	0.093	0.093	10.72	10.72	-40.0	-40.0	-35.9	31.9	28.1	36.8	0.19
910406	0700	0.43	0.093	0.093	10.72	10.72	-22.0	-40.0	-34.0	29.4	27.3	26.0	0.15
910406	1300	0.49	0.152	0.103	6.59	9.71	-44.0	-44.0	-34.0	34.3	28.2	32.5	0.17
910406	1900	0.50	0.152	0.103	6.59	9.71	-42.0	-40.0	-37.0	27.8	24.3	33.1	0.15
910407	0100	0.47	0.162	0.103	6.19	9.71	-46.0	-44.0	-36.6	28.2	21.7	29.3	0.18
910407	0700	0.42	0.142	0.103	7.04	9.71	-40.0	-40.0	-34.1	25.5	20.2	23.5	0.17
910407	1300	0.37	0.113	0.113	8.87	8.87	-26.0	-40.0	-32.3	27.1	21.3	20.0	0.19
910407	1900	0.37	0.123	0.113	8.16	8.87	-36.0	-36.0	-32.9	22.1	17.2	17.1	0.19
910408	0100	0.37	0.113	0.113	8.87	8.87	-38.0	-38.0	-38.6	20.9	17.9	16.6	0.19
910408	0700	0.35	0.113	0.113	8.87	8.87	-36.0	-32.0	-35.5	20.7	16.6	14.2	0.21
910408	1300	0.35	0.113	0.113	8.87	8.87	-30.0	-30.0	-33.8	20.6	17.9	13.4	0.21
910408	1900	0.40	0.113	0.113	8.87	8.87	-32.0	-32.0	-39.0	30.1	15.4	13.5	0.20
910409	0100	0.37	0.123	0.123	8.16	8.16	-38.0	-40.0	-37.5	19.9	16.2	12.1	0.21
910409	0700	0.47	0.152	0.152	6.59	6.59	-42.0	-42.0	-40.3	17.3	12.0	6.6	0.16
910409	1300	0.51	0.162	0.162	6.19	6.19	-46.0	-44.0	-43.8	21.7	11.8	6.4	0.15
910409	1900	0.50	0.162	0.113	6.19	8.87	-44.0	-44.0	-43.3	20.5	10.9	11.9	0.15
910410	0100	0.49	0.152	0.113	6.59	8.87	-42.0	-42.0	-41.6	18.4	13.3	14.1	0.20
910410	0700	0.45	0.142	0.142	7.04	7.04	-40.0	-42.0	-42.1	15.7	11.8	7.5	0.16
910410	1300	0.38	0.152	0.123	6.59	8.16	-44.0	-50.0	-40.3	26.1	15.6	13.5	0.18
910410	1900	0.38	0.123	0.123	8.16	8.16	-38.0	-42.0	-41.3	25.0	19.6	14.1	0.20
910411	0100	0.87	0.220	0.240	4.54	4.17	40.0	58.0	45.2	25.9	21.1	16.5	0.16
910411	0700	1.75	0.162	0.162	6.19	6.19	30.0	48.0	40.6	22.1	19.6	17.0	0.17
910411	1300	0.94	0.162	0.162	6.19	6.19	34.0	34.0	29.6	22.0	19.6	15.6	0.14
910411	1900	0.55	0.171	0.152	5.83	6.59	38.0	38.0	27.7	40.7	32.9	50.6	0.18
910412	0100	0.48	0.181	0.142	5.52	7.04	30.0	-12.0	10.0	44.0	40.3	36.0	0.14
910412	0700	0.91	0.308	0.308	3.25	3.25	40.0	42.0	29.4	26.9	23.4	20.3	0.19
910412	1300	1.36	0.162	0.162	6.19	6.19	26.0	26.0	27.7	25.3	23.8	19.8	0.10
910412	1900	1.02	0.162	0.152	6.19	6.59	34.0	34.0	29.3	32.2	31.1	32.6	0.13

(Sheet 25 of 37)

Table A1 (Continued)

Date	Time EST	$H_{ms}$ m	$f_{p,FD}$ Hz	$f_{p,FS}$ Hz	$T_{p,FD}$ sec	$T_{p,FS}$ sec	$\theta_{p,FD}$ deg	$\theta_{p,DS}$ deg	$\theta_{p,SW}$ deg	$\Delta\theta_{DS}$ deg	$\Delta\theta_{SW}$ deg	$\Delta\theta_{RDP}$ deg	$X$
910413	0100	1.11	0.162	0.152	6.19	6.59	18.0	14.0	15.2	37.1	36.9	34.6	0.10
910413	0700	0.87	0.162	0.181	6.19	5.52	18.0	18.0	23.3	36.5	33.9	27.6	0.12
910413	1300	0.84	0.162	0.162	6.19	6.19	16.0	10.0	7.6	39.8	39.2	24.4	0.10
910413	1900	0.89	0.171	0.132	5.83	7.56	16.0	18.0	-5.0	47.1	46.1	30.5	0.16
910414	0100	0.78	0.171	0.152	5.83	6.59	-32.0	-24.0	-25.9	42.7	36.8	37.1	0.12
910414	0700	0.67	0.093	0.181	10.72	5.52	-22.0	-20.0	-34.5	40.3	32.2	25.5	0.14
910414	1300	0.66	0.289	0.093	3.47	10.72	52.0	52.0	1.7	66.9	29.5	14.8	0.19
910414	1900	1.52	0.113	0.113	8.87	8.87	8.0	16.0	22.5	25.7	23.7	19.3	0.15
910415	0100	1.40	0.113	0.113	8.87	8.87	22.0	6.0	12.6	24.3	25.1	23.7	0.09
910415	0700	1.34	0.113	0.113	8.87	8.87	14.0	10.0	14.2	28.8	28.2	19.7	0.13
910415	1300	1.07	0.083	0.113	11.98	8.87	-2.0	10.0	7.8	29.9	31.2	26.2	0.10
910415	1900	0.86	0.103	0.103	9.71	9.71	-20.0	-16.0	-23.7	36.5	34.3	24.4	0.15
910416	0100	0.73	0.123	0.113	8.16	8.87	-20.0	-20.0	-27.0	35.4	27.7	24.1	0.10
910416	0700	0.67	0.162	0.113	6.19	8.87	-50.0	-48.0	-32.6	43.7	27.7	24.9	0.14
910416	1300	0.51	0.152	0.123	6.59	8.16	-48.0	-48.0	-40.2	46.3	36.2	33.6	0.14
910416	1900	0.60	0.132	0.123	7.56	8.16	-30.0	6.0	-15.9	49.9	38.0	39.2	0.15
910417	0100	0.58	0.123	0.142	8.16	7.04	-40.0	-28.0	-30.3	32.5	33.5	27.0	0.11
910417	0700	0.59	0.123	0.132	8.16	7.56	-42.0	-22.0	-27.1	32.4	32.5	31.5	0.15
910417	1300	0.47	0.123	0.123	8.16	8.16	-28.0	-28.0	-36.1	32.2	28.7	21.2	0.13
910417	1900	0.47	0.152	0.132	6.59	7.56	-48.0	-48.0	-37.8	34.8	25.7	27.0	0.19
910418	0100	0.40	0.064	0.064	15.63	15.63	-16.0	-30.0	-32.8	31.5	25.9	21.3	0.18
910418	0700	1.20	0.279	0.250	3.59	4.01	52.0	38.0	35.5	22.6	19.7	18.4	0.16
910418	1300	1.72	0.171	0.162	5.83	6.19	34.0	34.0	36.1	19.5	17.7	14.1	0.18
910418	1900	1.73	0.152	0.152	6.59	6.59	24.0	26.0	31.9	22.1	20.8	17.4	0.17
910419	0100	1.85	0.123	0.123	8.16	8.16	10.0	26.0	29.0	24.9	21.3	14.7	0.16
910419	0700	1.83	0.162	0.162	6.19	6.19	30.0	16.0	23.9	25.4	23.3	19.2	0.14
910419	1300	1.64	0.103	0.103	9.71	9.71	-4.0	14.0	22.3	31.0	27.1	20.5	0.13
910419	1600	1.73	0.103	0.103	9.71	9.71	12.0	14.0	17.2	28.8	28.7	19.5	0.10
910419	1900	1.73	0.103	0.103	9.71	9.71	-6.0	12.0	15.1	30.8	31.2	24.8	0.10
910420	0100	1.66	0.103	0.103	9.71	9.71	14.0	14.0	11.9	29.8	33.0	19.4	0.11
910420	0400	1.75	0.103	0.093	9.71	10.72	0.0	8.0	9.3	28.9	31.8	19.2	0.10
910420	0700	1.98	0.103	0.093	9.71	10.72	-4.0	12.0	-1.4	36.4	37.7	23.3	0.10
910420	1000	2.26	0.093	0.093	10.72	10.72	0.0	4.0	-3.3	36.9	37.8	21.7	0.11
910420	1300	2.75	0.103	0.113	9.71	8.87	-14.0	6.0	4.3	35.6	37.9	34.3	0.12
910420	1600	3.25	0.113	0.123	8.87	8.16	-16.0	12.0	19.7	41.8	33.2	39.0	0.16
910421	0400	1.94	0.123	0.083	8.16	11.98	8.0	14.0	20.2	28.7	20.4	22.7	0.16
910421	0700	1.91	0.123	0.093	8.16	10.72	8.0	10.0	18.9	28.4	20.5	19.7	0.16
910421	1300	1.39	0.123	0.123	8.16	8.16	12.0	16.0	18.4	26.5	22.0	21.4	0.17
910421	1900	0.90	0.123	0.113	8.16	8.87	22.0	20.0	17.6	24.2	20.6	20.5	0.15
910422	0100	0.64	0.093	0.093	10.72	10.72	-8.0	30.0	14.9	35.2	25.7	24.2	0.20
910422	0700	0.48	0.123	0.093	8.16	10.72	24.0	10.0	12.3	37.1	35.4	25.3	0.19
910422	1300	0.48	0.123	0.123	8.16	8.16	-34.0	-42.0	-28.3	48.1	39.8	19.4	0.20
910422	1900	0.54	0.123	0.103	8.16	9.71	-30.0	-32.0	-27.6	36.2	27.4	30.2	0.17
910423	0100	0.57	0.113	0.113	8.87	8.87	-38.0	-38.0	-25.1	43.0	28.6	31.0	0.21
910423	0700	0.53	0.123	0.103	8.16	9.71	-36.0	-38.0	-23.1	40.4	30.3	31.8	0.17
910423	1300	0.48	0.103	0.103	9.71	9.71	0.0	8.0	-11.9	43.0	34.5	19.1	0.24
910423	1900	0.48	0.132	0.113	7.56	8.87	-32.0	0.0	-8.5	39.2	29.4	36.2	0.20
910424	0100	0.53	0.132	0.123	7.56	8.16	-44.0	12.0	-8.9	41.5	29.9	41.6	0.22
910424	0700	0.57	0.123	0.123	8.16	8.16	-36.0	8.0	-21.8	39.8	30.5	42.3	0.17
910424	1300	0.62	0.132	0.132	7.56	7.56	-30.0	-40.0	-18.9	40.9	27.3	20.7	0.17
910424	1900	0.91	0.318	0.318	3.15	3.15	54.0	54.0	23.2	66.2	18.4	6.7	0.26
910425	0100	1.01	0.191	0.191	5.24	5.24	44.0	46.0	36.7	30.5	17.8	11.7	0.20
910425	0700	0.68	0.201	0.201	4.98	4.98	46.0	48.0	32.3	35.0	16.5	8.9	0.19

(Sheet 26 of 37)

Table A1 (Continued)

Date	Time EST	H <sub>m</sub> m	f <sub>pD</sub> Hz	f <sub>pS</sub> Hz	T <sub>pD</sub> sec	T <sub>pS</sub> sec	θ <sub>pD</sub> deg	θ <sub>pS</sub> deg	θ <sub>pSW</sub> deg	Δθ <sub>DS</sub> deg	Δθ <sub>SW</sub> deg	Δθ <sub>DP</sub> deg	χ
910425	1300	0.52	0.093	0.123	10.72	8.16	0.0	4.0	18.2	45.3	23.9	33.7	0.17
910425	1900	0.48	0.083	0.083	11.98	11.98	16.0	2.0	12.0	37.0	29.0	25.7	0.19
910426	0100	0.48	0.093	0.093	10.72	10.72	0.0	14.0	4.5	35.2	33.3	25.5	0.17
910426	0700	0.51	0.093	0.093	10.72	10.72	16.0	-14.0	2.2	30.5	31.2	27.4	0.21
910426	1300	0.55	0.103	0.093	9.71	10.72	6.0	-6.0	-2.2	27.7	28.0	22.9	0.16
910426	1900	0.46	0.093	0.093	10.72	10.72	14.0	0.0	-5.8	33.0	31.4	25.8	0.23
910427	0100	0.45	0.093	0.093	10.72	10.72	-6.0	-8.0	-13.6	31.0	29.4	26.2	0.17
910427	0700	0.48	0.083	0.093	11.98	10.72	-6.0	-8.0	-17.7	30.9	30.6	29.0	0.21
910427	1300	0.58	0.093	0.093	10.72	10.72	-12.0	-14.0	-22.6	32.1	26.4	24.7	0.15
910427	1900	0.59	0.093	0.093	10.72	10.72	-12.0	-10.0	-18.4	34.5	26.3	24.9	0.22
910428	0100	0.69	0.083	0.074	11.98	13.56	-10.0	-10.0	-15.5	25.7	23.2	21.9	0.18
910428	0700	0.66	0.083	0.083	11.98	11.98	-10.0	-10.0	-15.1	28.3	23.6	18.5	0.22
910428	1300	0.59	0.083	0.083	11.98	11.98	-12.0	-10.0	-19.9	34.7	24.4	23.5	0.18
910428	1900	0.53	0.083	0.083	11.98	11.98	-8.0	-10.0	-30.1	40.7	23.6	15.7	0.18
910429	0100	0.53	0.083	0.093	11.98	10.72	-10.0	-38.0	-27.2	35.4	23.0	22.0	0.16
910429	0700	0.84	0.162	0.162	6.19	6.19	-28.0	-26.0	-1.6	46.4	36.9	14.8	0.15
910429	1300	0.92	0.152	0.152	6.59	6.59	20.0	22.0	22.9	48.9	47.3	46.0	0.11
910429	1900	0.96	0.142	0.142	7.04	7.04	16.0	18.0	18.4	50.0	46.7	36.9	0.16
910430	0100	0.97	0.132	0.132	7.56	7.56	4.0	2.0	6.2	25.5	26.9	19.0	0.11
910430	0700	0.83	0.113	0.123	9.87	8.16	-4.0	-2.0	7.7	33.3	34.7	17.9	0.16
910430	1300	0.65	0.142	0.142	7.04	7.04	12.0	10.0	-0.7	32.7	34.6	22.9	0.14
910430	1900	0.58	0.074	0.074	13.56	13.56	-14.0	-12.0	-7.3	37.2	32.5	21.3	0.20
910501	0100	0.48	0.074	0.074	13.56	13.56	-10.0	-10.0	-5.3	34.8	35.5	25.3	0.18
910501	0700	0.43	0.074	0.074	13.56	13.56	-12.0	-14.0	-8.3	37.7	35.0	25.2	0.18
910501	1300	0.45	0.074	0.074	13.56	13.56	-12.0	-12.0	-19.9	43.6	31.9	20.0	0.19
910501	1900	0.40	0.074	0.083	13.56	11.98	-10.0	-10.0	-22.5	41.6	35.3	29.7	0.19
910502	0100	0.35	0.074	0.074	13.56	13.56	-16.0	-16.0	-12.4	34.8	34.5	26.7	0.27
910502	0700	0.45	0.318	0.318	3.15	3.15	62.0	62.0	21.6	71.1	29.0	15.3	0.35
910502	1300	0.39	0.074	0.083	13.56	11.98	-6.0	-8.0	0.4	43.3	37.3	29.8	0.22
910502	1900	0.42	0.123	0.074	8.16	13.56	-42.0	-42.0	-9.6	47.6	37.2	23.3	0.17
910503	0100	0.40	0.123	0.083	8.16	11.98	-40.0	-16.0	-17.7	34.2	34.5	28.2	0.22
910503	0700	0.33	0.083	0.083	11.98	11.98	-4.0	4.0	-7.1	37.7	38.7	31.0	0.21
910503	1300	0.73	0.269	0.259	3.72	3.86	52.0	52.0	42.6	20.7	18.1	14.4	0.24
910503	1900	0.57	0.201	0.191	4.98	5.24	50.0	50.0	40.9	27.1	20.1	13.6	0.14
910504	0100	0.42	0.181	0.181	5.52	5.52	32.0	34.0	22.6	35.7	22.9	7.9	0.18
910504	0700	0.34	0.083	0.083	11.98	11.98	-8.0	8.0	8.9	53.7	41.0	27.9	0.16
910504	1300	0.38	0.318	0.308	3.15	3.25	44.0	30.0	18.2	60.9	47.0	26.9	0.17
910504	1900	0.37	0.210	0.318	4.75	3.15	36.0	36.0	2.8	62.2	61.9	75.2	0.16
910505	0100	0.50	0.181	0.298	5.52	3.35	34.0	32.0	-11.3	69.1	37.6	26.6	0.17
910505	0700	0.43	0.201	0.191	4.98	5.24	34.0	34.0	-7.0	57.9	44.6	54.9	0.14
910505	1300	0.40	0.142	0.152	7.04	6.59	-16.0	-16.0	-32.6	41.0	45.3	16.9	0.14
910505	1900	0.41	0.191	0.191	5.24	5.24	-56.0	-56.0	-31.8	52.5	35.0	22.2	0.15
910506	0100	0.49	0.191	0.201	5.24	4.98	-56.0	-56.0	-43.3	44.2	26.8	18.0	0.13
910506	0700	0.67	0.191	0.181	5.24	5.52	-48.0	-48.0	-38.9	32.8	27.6	25.8	0.11
910506	1300	0.52	0.181	0.181	5.52	5.52	-46.0	-46.0	-36.7	41.0	27.1	27.2	0.14
910506	1900	0.44	0.162	0.152	6.19	6.59	-44.0	-44.0	-36.6	40.6	27.6	35.6	0.14
910507	0100	0.42	0.162	0.162	6.19	6.19	-44.0	-46.0	-40.7	37.6	28.0	23.7	0.17
910507	0700	0.36	0.152	0.152	6.59	6.59	-44.0	-44.0	-37.5	42.8	35.6	27.7	0.18
910507	1300	0.81	0.230	0.230	4.35	4.35	48.0	46.0	32.5	42.1	32.3	23.1	0.17
910507	1900	0.56	0.210	0.210	4.75	4.75	38.0	36.0	7.1	62.2	42.2	20.7	0.13
910508	0100	0.49	0.152	0.210	6.59	4.75	-50.0	12.0	-0.3	50.8	43.8	20.4	0.17
910508	0700	0.44	0.093	0.093	10.72	10.72	-6.0	6.0	-7.0	37.7	33.2	24.5	0.15

(Sheet 27 of 37)

Table A1 (Continued)

Date	Time EST	$H_m$ m	$f_{p,FD}$ Hz	$f_{p,FS}$ Hz	$T_{p,FD}$ sec	$T_{p,FS}$ sec	$\theta_{p,FD}$ deg	$\theta_{p,FS}$ deg	$\theta_{p,SW}$ deg	$\Delta\theta_{DS}$ deg	$\Delta\theta_{SW}$ deg	$\Delta\theta_{DP}$ deg	$\chi$
910508	1300	0.43	0.093	0.093	10.72	10.72	-4.0	8.0	-14.4	40.9	34.7	23.6	0.19
910508	1900	0.42	0.171	0.093	5.83	10.72	-44.0	-46.0	-27.1	40.9	35.4	32.0	0.15
910509	0100	0.43	0.171	0.171	5.83	5.83	-46.0	-46.0	-32.2	38.7	34.5	32.7	0.16
910509	0700	0.42	0.093	0.181	10.72	5.52	-12.0	-14.0	-32.2	35.2	32.0	26.1	0.14
910509	1300	0.41	0.142	0.093	7.04	10.72	-42.0	-44.0	-35.5	36.3	30.3	23.8	0.15
910509	1900	0.51	0.279	0.269	3.59	3.72	8.0	-44.0	-20.6	45.0	31.9	29.6	0.10
910510	0100	0.51	0.201	0.201	4.98	4.98	-48.0	-48.0	-27.9	44.6	36.7	25.2	0.13
910510	0700	0.50	0.210	0.210	4.75	4.75	-52.0	-46.0	-41.8	31.7	27.1	21.5	0.12
910510	1300	0.47	0.132	0.132	7.56	7.56	-36.0	-48.0	-42.4	33.8	29.3	11.8	0.15
910510	1900	0.41	0.132	0.123	7.56	8.16	-42.0	-42.0	-33.7	37.6	36.7	22.2	0.16
910511	0100	0.99	0.210	0.210	4.75	4.75	38.0	38.0	19.9	48.3	37.0	30.7	0.09
910511	0700	0.99	0.181	0.191	5.52	5.24	12.0	2.0	6.4	32.9	32.9	27.1	0.10
910511	1300	1.01	0.123	0.123	8.16	8.16	-6.0	6.0	8.6	32.4	32.9	18.1	0.10
910511	1900	0.75	0.123	0.123	8.16	8.16	6.0	6.0	10.6	30.8	32.7	23.5	0.13
910512	0100	0.81	0.103	0.103	9.71	9.71	-2.0	-6.0	-3.4	27.9	29.5	21.8	0.12
910512	0700	0.79	0.103	0.113	9.71	8.87	-18.0	-12.0	-16.5	27.2	28.1	23.9	0.15
910512	1300	0.80	0.103	0.103	9.71	9.71	-16.0	-16.0	-18.6	22.1	22.5	17.7	0.12
910512	1900	0.69	0.103	0.103	9.71	9.71	-14.0	-14.0	-22.4	30.6	19.7	19.0	0.19
910513	0100	0.61	0.093	0.093	10.72	10.72	-8.0	-14.0	-15.1	25.5	23.9	24.8	0.13
910513	0700	0.56	0.093	0.093	10.72	10.72	-14.0	-12.0	-16.2	22.1	22.0	17.8	0.20
910513	1300	0.49	0.093	0.093	10.72	10.72	-16.0	-14.0	-17.2	22.2	22.4	21.0	0.16
910513	1900	0.46	0.093	0.093	10.72	10.72	-10.0	-10.0	-19.2	37.3	22.2	21.3	0.25
910514	0100	0.43	0.093	0.093	10.72	10.72	-16.0	-14.0	-14.6	30.5	29.2	30.4	0.16
910514	0700	0.33	0.103	0.093	9.71	10.72	-12.0	-12.0	-12.6	36.5	30.1	23.9	0.23
910514	1300	0.32	0.103	0.103	9.71	9.71	-8.0	-54.0	-26.2	51.0	27.7	31.8	0.22
910514	1900	0.29	0.250	0.103	4.01	9.71	-56.0	-56.0	-35.8	42.3	20.0	35.5	0.27
910515	0100	0.25	0.210	0.103	4.75	9.71	-54.0	-46.0	-32.8	43.9	26.8	34.0	0.23
910515	0700	0.31	0.220	0.103	4.54	9.71	-54.0	-52.0	-44.4	32.1	20.1	31.8	0.15
910515	1300	0.27	0.162	0.113	6.19	8.87	-46.0	-46.0	-40.5	31.7	24.1	36.6	0.18
910515	1900	0.45	0.191	0.279	5.24	3.59	-52.0	-52.0	1.4	77.0	40.5	41.0	0.19
910516	0100	0.51	0.250	0.269	4.01	3.72	40.0	40.0	14.9	75.5	33.2	38.1	0.12
910516	0700	0.62	0.210	0.220	4.75	4.54	36.0	36.0	22.0	53.9	32.8	23.5	0.14
910516	1300	0.57	0.220	0.230	4.54	4.35	42.0	44.0	21.1	49.0	35.4	36.5	0.14
910516	1900	0.68	0.152	0.171	6.59	5.83	2.0	0.0	-1.6	41.6	41.0	31.8	0.15
910517	0100	0.51	0.152	0.152	6.59	6.59	4.0	2.0	-10.7	42.4	39.9	21.4	0.14
910517	0700	0.47	0.162	0.220	6.19	4.54	4.0	-42.0	-19.1	38.7	37.2	30.5	0.14
910517	1300	0.39	0.152	0.162	6.59	6.19	-14.0	-14.0	-24.4	36.5	33.3	31.8	0.14
910517	1900	0.43	0.181	0.181	5.52	5.52	-18.0	-18.0	-28.7	33.6	25.5	18.3	0.19
910518	0100	0.35	0.162	0.113	6.19	8.87	-14.0	-14.0	-29.4	38.0	27.4	30.9	0.16
910518	0700	0.33	0.113	0.113	8.87	8.87	-16.0	4.0	-22.4	44.7	32.7	36.7	0.18
910518	1300	1.46	0.181	0.181	5.52	5.52	28.0	24.0	25.3	24.6	24.8	17.0	0.08
910518	1600	2.02	0.162	0.162	6.19	6.19	24.0	26.0	30.0	25.6	27.2	20.0	0.11
910518	1900	2.25	0.152	0.152	6.59	6.59	20.0	20.0	27.8	26.4	27.6	18.2	0.14
910518	2200	2.33	0.132	0.132	7.56	7.56	28.0	16.0	28.5	26.9	26.3	18.6	0.14
910519	0100	2.31	0.113	0.113	8.87	8.87	0.0	16.0	23.0	25.9	25.0	21.6	0.15
910519	0400	2.45	0.113	0.113	8.87	8.87	8.0	8.0	16.5	24.4	24.9	16.8	0.12
910519	0700	2.61	0.093	0.103	10.72	9.71	0.0	16.0	17.5	24.8	25.4	19.9	0.12
910519	1000	2.63	0.152	0.142	6.59	7.04	18.0	18.0	17.1	26.4	26.3	25.5	0.14
910519	1300	2.48	0.152	0.142	6.59	7.04	18.0	16.0	20.3	26.7	26.4	23.0	0.13
910519	1600	2.16	0.093	0.152	10.72	6.59	2.0	14.0	15.9	28.9	27.5	28.1	0.12
910519	1900	2.00	0.103	0.103	9.71	9.71	-2.0	14.0	14.9	26.7	25.6	19.8	0.12
910519	2200	1.92	0.132	0.113	7.56	8.87	8.0	10.0	19.1	30.8	27.3	20.0	0.14
910520	0100	1.84	0.083	0.093	11.98	10.72	-18.0	4.0	14.0	34.4	29.6	22.1	0.14

(Sheet 28 of 37)

Table A1 (Continued)

Date	Time EST	H <sub>m</sub> m	f <sub>p,0</sub> Hz	f <sub>p,15</sub> Hz	T <sub>p,0</sub> sec	T <sub>p,15</sub> sec	θ <sub>p,0</sub> deg	θ <sub>p,15</sub> deg	θ <sub>p,30</sub> deg	Δθ <sub>0-15</sub> deg	Δθ <sub>15-30</sub> deg	Δθ <sub>0-30</sub> deg	χ
910520	0400	1.84	0.093	0.093	10.72	10.72	-14.0	-12.0	6.8	31.8	29.2	23.6	0.12
910520	0700	1.65	0.103	0.093	9.71	10.72	-8.0	10.0	9.1	28.5	28.4	21.2	0.11
910520	1300	1.38	0.083	0.142	11.98	7.04	-6.0	10.0	11.8	36.0	37.0	35.4	0.14
910520	1900	1.25	0.093	0.093	10.72	10.72	-4.0	-4.0	-0.5	34.6	36.7	20.9	0.11
910521	0100	1.21	0.093	0.093	10.72	10.72	-8.0	-10.0	-16.8	35.4	37.5	25.7	0.14
910521	0700	1.07	0.103	0.103	9.71	9.71	-8.0	-12.0	-15.9	35.2	34.9	24.2	0.10
910521	1300	1.02	0.103	0.113	9.71	8.87	-6.0	-10.0	-23.5	38.4	35.1	26.8	0.12
910521	1900	0.93	0.113	0.132	8.87	7.56	-10.0	-12.0	-29.2	35.9	34.0	31.2	0.11
910522	0100	0.87	0.103	0.132	9.71	7.56	-4.0	-6.0	-21.8	37.5	34.8	33.4	0.14
910522	0700	0.75	0.123	0.123	8.16	8.16	-38.0	-12.0	-30.7	32.3	31.0	33.4	0.11
910522	1300	0.67	0.132	0.123	7.56	8.16	-42.0	-42.0	-33.4	35.6	32.2	35.3	0.15
910522	1900	0.59	0.123	0.123	8.16	8.16	-28.0	-40.0	-28.8	33.5	28.3	28.4	0.15
910523	0100	0.55	0.123	0.123	8.16	8.16	-28.0	-40.0	-35.8	30.5	26.5	24.4	0.19
910523	0700	0.46	0.123	0.123	8.16	8.16	-34.0	-38.0	-34.6	26.7	23.7	15.4	0.18
910523	1300	0.48	0.123	0.123	8.16	8.16	-38.0	-40.0	-39.1	21.2	19.7	14.9	0.20
910523	1900	0.41	0.132	0.123	7.56	8.16	-42.0	-26.0	-36.6	24.7	22.7	22.7	0.22
910524	0100	0.41	0.123	0.123	8.16	8.16	-40.0	-42.0	-39.1	28.0	26.1	17.4	0.21
910524	0700	0.43	0.132	0.123	7.56	8.16	-30.0	-42.0	-37.7	25.0	23.7	18.0	0.20
910524	1300	0.48	0.123	0.123	8.16	8.16	-34.0	-42.0	-38.4	23.8	22.4	15.4	0.20
910524	1900	0.44	0.152	0.123	6.59	8.16	-42.0	-42.0	-37.8	26.2	21.6	15.1	0.21
910525	0100	0.49	0.142	0.142	7.04	7.04	-42.0	-42.0	-39.6	25.5	22.5	19.2	0.20
910525	0700	0.53	0.142	0.132	7.04	7.56	-40.0	-40.0	-40.9	27.2	23.7	21.3	0.19
910525	1300	0.50	0.142	0.132	7.04	7.56	-40.0	-42.0	-36.9	28.3	22.0	28.9	0.22
910525	1900	0.47	0.142	0.132	7.04	7.56	-40.0	-42.0	-35.7	22.0	17.3	15.0	0.22
910526	0100	0.50	0.142	0.142	7.04	7.04	-42.0	-42.0	-36.8	23.6	20.6	17.4	0.21
910526	0700	0.56	0.142	0.132	7.04	7.56	-40.0	-40.0	-36.9	23.4	19.5	12.9	0.19
910526	1300	0.55	0.152	0.142	6.59	7.04	-38.0	-38.0	-34.5	19.3	15.1	13.2	0.20
910526	1900	0.48	0.132	0.132	7.56	7.56	-40.0	-42.0	-35.3	22.4	17.6	11.9	0.22
910527	0100	0.46	0.132	0.142	7.56	7.04	-38.0	-40.0	-34.6	21.5	16.6	12.9	0.19
910527	0700	0.47	0.152	0.074	6.59	13.56	-42.0	-42.0	-38.2	22.2	18.3	31.9	0.19
910527	1300	0.48	0.152	0.074	6.59	13.56	-34.0	-40.0	-35.4	21.6	15.8	24.9	0.22
910527	1900	0.49	0.142	0.074	7.04	13.56	-42.0	-58.0	-41.9	25.9	15.1	26.8	0.23
910528	0100	0.41	0.142	0.074	7.04	13.56	-40.0	-40.0	-35.5	27.7	18.1	21.7	0.23
910528	0700	0.41	0.152	0.074	6.59	13.56	-42.0	-44.0	-35.6	29.0	19.2	27.9	0.19
910528	1300	0.38	0.074	0.074	13.56	13.56	-14.0	-40.0	-31.1	28.9	21.1	25.8	0.22
910528	1900	0.40	0.074	0.074	13.56	13.56	-12.0	-42.0	-32.2	34.1	21.8	27.5	0.26
910529	0100	0.39	0.074	0.074	13.56	13.56	-16.0	-36.0	-26.5	28.1	23.8	23.5	0.26
910529	0700	0.39	0.083	0.074	11.98	13.56	-30.0	-30.0	-33.5	29.5	27.3	27.3	0.22
910529	1300	0.38	0.083	0.083	11.98	11.98	-24.0	-26.0	-26.1	32.4	28.3	22.3	0.24
910529	1900	0.39	0.083	0.083	11.98	11.98	-20.0	-32.0	-26.4	29.8	24.4	21.0	0.23
910530	0100	0.40	0.083	0.083	11.98	11.98	-26.0	-28.0	-23.6	30.3	27.7	26.9	0.26
910530	0700	0.43	0.083	0.083	11.98	11.98	-30.0	-30.0	-23.2	31.6	27.5	22.3	0.20
910530	1300	0.41	0.083	0.083	11.98	11.98	-18.0	-24.0	-25.9	30.5	26.8	24.6	0.22
910530	1900	0.38	0.064	0.083	15.63	11.98	-16.0	-42.0	-27.8	30.5	24.1	30.0	0.23
910531	0100	0.36	0.083	0.083	11.98	11.98	-26.0	-28.0	-30.8	28.8	23.2	28.8	0.24
910531	0700	0.36	0.093	0.093	10.72	10.72	-32.0	-38.0	-30.7	26.8	25.6	20.3	0.18
910531	1300	0.37	0.093	0.093	10.72	10.72	-24.0	-18.0	-24.4	28.3	30.5	18.1	0.20
910531	1900	0.39	0.230	0.093	4.35	10.72	-58.0	-58.0	-34.1	37.0	19.7	24.9	0.23
910601	0100	0.34	0.113	0.093	8.87	10.72	-34.0	-14.0	-26.5	32.6	30.8	31.7	0.24
910601	0700	0.34	0.093	0.093	10.72	10.72	-20.0	-18.0	-25.4	38.4	36.4	27.1	0.19
910601	1300	0.34	0.093	0.093	10.72	10.72	-30.0	-30.0	-37.1	36.5	29.7	27.3	0.21
910601	1900	0.32	0.074	0.093	13.56	10.72	-16.0	-16.0	-24.5	37.4	38.7	30.0	0.26

(Sheet 29 of 37)

Table A1 (Continued)

Date	Time EST	$H_m$ m	$f_{p,FD}$ Hz	$f_{p,FS}$ Hz	$T_{p,FD}$ sec	$T_{p,FS}$ sec	$\theta_{p,FD}$ deg	$\theta_{p,DS}$ deg	$\theta_{p,SW}$ deg	$\Delta\theta_{DS}$ deg	$\Delta\theta_{SW}$ deg	$\Delta\theta_{DP}$ deg	$\chi$
910602	0100	0.33	0.093	0.093	10.72	10.72	-26.0	-14.0	-18.6	40.9	40.5	34.6	0.23
910602	0700	0.36	0.093	0.093	10.72	10.72	-28.0	-30.0	-8.2	40.9	39.9	36.2	0.26
910602	1300	0.48	0.093	0.093	10.72	10.72	12.0	12.0	-0.4	33.4	35.1	29.8	0.25
910602	1900	0.63	0.093	0.093	10.72	10.72	12.0	12.0	6.9	29.2	30.2	26.6	0.21
910603	0100	0.70	0.083	0.083	11.98	11.98	-8.0	-8.0	-6.4	25.5	26.5	23.8	0.27
910603	0700	0.65	0.083	0.083	11.98	11.98	-6.0	-8.0	-5.2	29.1	29.1	27.5	0.23
910603	1300	0.62	0.083	0.083	11.98	11.98	-16.0	-6.0	-6.6	31.1	32.1	33.3	0.25
910603	1900	0.59	0.103	0.093	9.71	10.72	-4.0	-4.0	-1.7	29.1	28.9	24.2	0.22
910604	0100	0.57	0.093	0.093	10.72	10.72	6.0	4.0	-6.6	28.8	28.7	22.8	0.20
910604	0700	0.51	0.093	0.093	10.72	10.72	-14.0	-8.0	-5.4	27.4	29.1	27.2	0.22
910604	1300	1.46	0.230	0.230	4.35	4.35	48.0	46.0	43.3	10.6	9.9	6.6	0.36
910604	1900	1.53	0.162	0.162	6.19	6.19	30.0	30.0	26.4	19.5	19.0	12.1	0.13
910605	0100	1.16	0.142	0.142	7.04	7.04	30.0	34.0	31.6	21.8	20.9	15.6	0.18
910605	0700	1.45	0.142	0.142	7.04	7.04	22.0	24.0	28.4	25.2	23.1	16.9	0.13
910605	1300	1.46	0.162	0.123	6.19	8.16	20.0	20.0	24.4	22.3	20.2	21.7	0.15
910605	1900	1.32	0.142	0.123	7.04	8.16	14.0	16.0	21.1	25.8	24.0	19.9	0.14
910606	0100	1.34	0.093	0.113	10.72	8.87	-2.0	16.0	15.8	30.7	29.8	26.1	0.15
910606	0700	1.67	0.093	0.093	10.72	10.72	-2.0	-2.0	2.8	27.2	28.2	22.3	0.11
910606	1300	1.75	0.083	0.083	11.98	11.98	14.0	10.0	13.1	26.5	25.8	24.0	0.13
910606	1900	1.51	0.083	0.083	11.98	11.98	4.0	4.0	9.4	28.8	28.6	19.3	0.11
910607	0100	1.37	0.093	0.093	10.72	10.72	2.0	4.0	9.7	31.7	30.3	22.0	0.14
910607	0700	1.51	0.181	0.142	5.52	7.04	0.0	2.0	12.9	32.0	29.0	29.5	0.10
910607	1300	1.38	0.181	0.181	5.52	5.52	8.0	6.0	11.9	33.9	29.6	20.6	0.13
910607	1900	1.30	0.132	0.132	7.56	7.56	-14.0	-12.0	1.3	33.2	30.2	21.5	0.13
910608	0100	1.20	0.132	0.132	7.56	7.56	-2.0	-16.0	-2.5	33.4	33.0	24.7	0.14
910608	0700	1.06	0.093	0.132	10.72	7.56	-6.0	-6.0	-3.7	34.9	34.5	34.7	0.12
910608	1900	0.85	0.103	0.123	9.71	8.16	-10.0	-18.0	-15.8	34.1	33.5	32.3	0.15
910609	0100	0.78	0.123	0.123	8.16	8.16	-22.0	-16.0	-21.1	32.0	31.0	30.2	0.16
910609	0700	0.62	0.113	0.113	8.87	8.87	-2.0	-10.0	-17.0	32.8	32.1	33.6	0.16
910609	1300	0.55	0.113	0.113	8.87	8.87	-22.0	-24.0	-28.3	29.1	29.0	31.5	0.19
910609	1900	0.49	0.113	0.113	8.87	8.87	-38.0	-38.0	-28.2	34.5	32.9	30.6	0.20
910610	0100	0.52	0.113	0.113	8.87	8.87	-28.0	-32.0	-30.8	29.1	27.9	27.0	0.18
910610	0700	0.47	0.093	0.113	10.72	8.87	-26.0	-16.0	-32.7	33.8	33.4	35.0	0.19
910610	1300	0.49	0.113	0.113	8.87	8.87	-34.0	-42.0	-34.5	33.8	32.7	24.0	0.18
910610	1900	0.46	0.113	0.113	8.87	8.87	-14.0	-38.0	-24.9	27.7	27.2	24.2	0.22
910611	0100	0.46	0.103	0.103	9.71	9.71	-34.0	-18.0	-28.7	26.9	25.5	27.4	0.19
910611	0700	0.40	0.103	0.103	9.71	9.71	-14.0	-18.0	-21.4	27.3	27.9	23.2	0.20
910611	1300	0.41	0.103	0.103	9.71	9.71	-22.0	-24.0	-27.9	23.8	21.7	19.4	0.20
910611	1900	0.42	0.308	0.103	3.25	9.71	-50.0	-50.0	-35.6	29.0	17.7	24.5	0.25
910612	0100	0.35	0.103	0.103	9.71	9.71	-30.0	-28.0	-32.3	20.8	20.5	18.9	0.19
910612	0700	0.38	0.103	0.103	9.71	9.71	-30.0	-28.0	-36.6	25.7	20.8	20.1	0.23
910612	1300	0.36	0.103	0.103	9.71	9.71	-26.0	-24.0	-30.9	23.8	16.5	18.6	0.17
910612	1900	0.46	0.279	0.103	3.59	9.71	-54.0	-54.0	-39.4	30.0	12.6	20.4	0.25
910613	0100	0.34	0.103	0.103	9.71	9.71	-28.0	-26.0	-33.3	29.2	18.4	19.8	0.17
910613	0700	0.32	0.113	0.103	8.87	9.71	-30.0	-28.0	-41.2	31.9	27.2	24.0	0.19
910613	1300	0.41	0.103	0.113	9.71	8.87	-16.0	-26.0	5.2	67.2	39.3	23.8	0.17
910613	1900	0.64	0.181	0.171	5.52	5.83	28.0	28.0	11.9	39.9	28.6	13.7	0.18
910614	0100	0.67	0.142	0.152	7.04	6.59	14.0	30.0	19.6	33.9	26.4	20.5	0.11
910614	0700	0.62	0.181	0.171	5.52	5.83	26.0	26.0	11.6	38.9	25.6	25.4	0.17
910614	1300	0.42	0.113	0.113	8.87	8.87	4.0	-36.0	-0.4	44.7	42.6	34.7	0.15
910614	1900	0.39	0.103	0.103	9.71	9.71	-30.0	-42.0	-14.6	37.4	35.4	27.0	0.20
910615	0100	0.40	0.113	0.103	8.87	9.71	-38.0	-38.0	-19.6	36.6	34.7	23.7	0.17

(Sheet 30 of 37)

Table A1 (Continued)

Date	Time EST	H <sub>m</sub> m	f <sub>p,PD</sub> Hz	f <sub>p,PS</sub> Hz	T <sub>p,PD</sub> sec	T <sub>p,PS</sub> sec	θ <sub>p,PD</sub> deg	θ <sub>p,PS</sub> deg	θ <sub>p,SW</sub> deg	Δθ <sub>DS</sub> deg	Δθ <sub>SW</sub> deg	Δθ <sub>DP</sub> deg	X
910615	0700	0.40	0.113	0.113	8.87	8.87	-34.0	-40.0	-28.2	38.4	32.2	24.0	0.18
910615	1300	0.39	0.113	0.113	8.87	8.87	-28.0	-40.0	-33.6	32.1	25.8	18.8	0.19
910615	1900	0.42	0.123	0.113	8.16	8.87	-40.0	-56.0	-41.5	32.0	16.4	23.8	0.23
910616	0100	0.38	0.113	0.113	8.87	8.87	-36.0	-38.0	-36.8	28.0	17.0	19.4	0.21
910616	0700	0.45	0.171	0.113	5.83	8.87	-46.0	-46.0	-38.6	23.2	14.8	17.7	0.19
910616	1300	0.46	0.113	0.113	8.87	8.87	-38.0	-40.0	-41.6	27.2	16.9	22.4	0.18
910616	1900	0.52	0.240	0.123	4.17	8.16	-56.0	-56.0	-41.0	28.3	14.1	22.1	0.24
910617	0100	0.46	0.113	0.113	8.87	8.87	-30.0	-30.0	-38.4	29.0	16.4	22.9	0.18
910617	0700	0.49	0.201	0.113	4.98	8.87	-52.0	-50.0	-37.1	27.4	20.8	20.3	0.17
910617	1300	0.45	0.113	0.113	8.87	8.87	-40.0	-30.0	-37.8	26.2	18.2	16.8	0.20
910617	1900	0.48	0.113	0.113	8.87	8.87	-32.0	-32.0	-34.1	19.9	17.4	13.6	0.19
910618	0100	0.46	0.113	0.113	8.87	8.87	-32.0	-42.0	-39.7	30.6	20.3	24.4	0.19
910618	0700	0.53	0.152	0.152	6.59	6.59	-38.0	-36.0	-37.9	29.1	22.6	15.6	0.18
910618	1300	0.57	0.191	0.191	5.24	5.24	-56.0	-40.0	-40.1	31.0	21.4	11.9	0.18
910618	1900	0.58	0.171	0.093	5.83	10.72	-38.0	-40.0	-32.5	42.4	37.7	27.4	0.19
910619	0100	0.71	0.142	0.152	7.04	6.59	32.0	30.0	1.7	66.7	51.5	17.3	0.21
910619	1300	0.66	0.171	0.152	5.83	6.59	26.0	26.0	11.0	59.2	42.4	18.4	0.18
910619	1900	0.63	0.162	0.103	6.19	9.71	20.0	20.0	5.3	51.0	45.7	26.7	0.16
910620	0100	0.60	0.171	0.113	5.83	8.87	22.0	-38.0	-15.0	47.9	46.7	25.7	0.20
910620	0700	0.53	0.152	0.103	6.59	9.71	-40.0	-40.0	-10.1	54.8	44.6	31.7	0.18
910620	1300	0.57	0.113	0.113	8.87	8.87	-36.0	-36.0	-9.6	46.6	35.5	27.0	0.18
910620	1900	0.60	0.142	0.123	7.04	8.16	-44.0	-42.0	-25.5	41.1	34.6	20.3	0.16
910621	0100	0.51	0.123	0.123	8.16	8.16	-42.0	-42.0	-37.3	38.2	34.6	30.5	0.18
910621	0700	0.48	0.132	0.142	7.56	7.04	-34.0	-34.0	-34.8	34.6	35.3	26.1	0.17
910621	1300	0.57	0.142	0.142	7.04	7.04	-38.0	-30.0	-35.4	26.5	24.2	12.7	0.17
910621	1900	0.44	0.162	0.083	6.19	11.98	-44.0	-44.0	-38.9	32.9	20.7	27.7	0.17
910622	0100	0.40	0.152	0.093	6.59	10.72	-44.0	-44.0	-38.4	35.5	29.1	35.0	0.19
910622	0700	0.45	0.162	0.142	6.19	7.04	-38.0	-38.0	-35.5	22.5	19.3	12.7	0.17
910622	1300	0.49	0.142	0.142	7.04	7.04	-40.0	-42.0	-38.5	26.9	19.3	13.9	0.19
910622	1900	0.49	0.132	0.132	7.56	7.56	-34.0	-36.0	-40.1	23.7	25.2	9.1	0.18
910623	0100	0.47	0.123	0.123	8.16	8.16	-40.0	-40.0	-37.5	24.7	25.6	15.6	0.19
910623	0700	0.42	0.123	0.123	8.16	8.16	-28.0	-28.0	-22.8	41.1	36.9	17.7	0.19
910623	1300	1.20	0.162	0.162	6.19	6.19	40.0	44.0	39.0	18.1	17.7	10.5	0.19
910623	1600	2.30	0.152	0.152	6.59	6.59	36.0	40.0	36.4	20.9	20.8	14.3	0.18
910623	1900	2.56	0.132	0.132	7.56	7.56	32.0	32.0	28.3	23.8	23.3	21.4	0.17
910623	2200	2.33	0.132	0.113	7.56	8.87	12.0	12.0	21.3	24.0	23.6	21.0	0.15
910624	0100	2.05	0.123	0.123	8.16	8.16	10.0	16.0	18.1	26.6	24.2	20.1	0.13
910624	0400	1.97	0.123	0.083	8.16	11.98	20.0	16.0	19.6	28.3	26.4	28.8	0.13
910624	0700	2.02	0.093	0.093	10.72	10.72	2.0	16.0	21.4	30.5	26.1	21.1	0.14
910624	1000	1.94	0.093	0.093	10.72	10.72	4.0	14.0	16.3	30.2	27.1	21.9	0.12
910624	1300	1.91	0.132	0.103	7.56	9.71	14.0	14.0	14.8	27.5	27.1	22.6	0.11
910624	1900	1.38	0.093	0.093	10.72	10.72	-2.0	8.0	6.6	32.2	30.9	26.3	0.13
910625	0100	1.30	0.103	0.103	9.71	9.71	-16.0	-16.0	1.0	32.3	33.0	26.6	0.10
910625	0700	1.42	0.113	0.093	8.87	10.72	-8.0	-10.0	-2.8	31.6	28.8	23.1	0.12
910625	1300	1.49	0.074	0.083	13.56	11.98	-10.0	-10.0	-1.2	30.0	27.6	25.0	0.11
910625	1900	1.33	0.083	0.083	11.98	11.98	-12.0	-12.0	-0.7	29.9	28.7	20.0	0.12
910626	0100	1.23	0.074	0.083	13.56	11.98	-12.0	-14.0	-3.9	27.1	28.2	23.6	0.12
910626	0700	1.33	0.074	0.083	13.56	11.98	-12.0	-12.0	-16.5	30.8	34.1	29.5	0.12
910626	1300	1.20	0.083	0.083	11.98	11.98	-12.0	-12.0	-20.1	28.6	29.9	18.7	0.12
910626	1900	1.24	0.152	0.083	6.59	11.98	-44.0	-44.0	-32.3	36.5	28.9	22.6	0.13
910627	0100	1.07	0.083	0.083	11.98	11.98	-10.0	-10.0	-28.1	33.7	32.2	26.0	0.11
910627	0700	1.09	0.083	0.083	11.98	11.98	-14.0	-14.0	-24.5	33.1	31.2	24.4	0.13
910627	1300	1.03	0.074	0.083	13.56	11.98	-14.0	-12.0	-27.0	35.1	30.8	28.6	0.12

(Sheet 31 of 37)

Table A1 (Continued)

Date	Time EST	H <sub>m</sub> m	f <sub>p,FD</sub> Hz	f <sub>p,FS</sub> Hz	T <sub>p,FD</sub> sec	T <sub>p,FS</sub> sec	θ <sub>p,FD</sub> deg	θ <sub>p,DS</sub> deg	θ <sub>p,SW</sub> deg	Δθ <sub>DS</sub> deg	Δθ <sub>SW</sub> deg	Δθ <sub>DP</sub> deg	χ
910627	1900	1.04	0.142	0.083	7.04	11.98	-44.0	-44.0	-32.6	37.6	30.2	28.4	0.13
910628	0100	0.91	0.083	0.083	11.98	11.98	-6.0	-38.0	-29.5	36.8	28.8	27.9	0.11
910628	0700	0.84	0.083	0.083	11.98	11.98	-8.0	-14.0	-28.5	35.5	28.7	23.9	0.14
910628	1300	0.79	0.093	0.093	10.72	10.72	-14.0	-16.0	-26.3	34.2	27.1	27.0	0.12
910628	1900	0.68	0.083	0.083	11.98	11.98	-18.0	-36.0	-30.3	31.2	24.3	20.3	0.17
910629	0100	0.57	0.093	0.093	10.72	10.72	-8.0	-24.0	-23.8	29.6	25.1	23.4	0.14
910629	0700	0.51	0.083	0.093	11.98	10.72	-24.0	-22.0	-29.9	31.8	28.5	25.8	0.18
910629	1300	0.43	0.123	0.083	8.16	11.98	-30.0	-40.0	-30.8	28.1	26.7	27.3	0.17
910629	1900	0.46	0.308	0.113	3.25	8.87	-52.0	-42.0	-38.0	29.1	19.2	24.7	0.27
910630	0100	0.38	0.113	0.113	8.87	8.87	-32.0	-32.0	-33.8	22.6	17.8	16.3	0.19
910630	0700	0.37	0.123	0.113	8.16	8.87	-32.0	-32.0	-34.8	17.9	16.7	16.4	0.18
910630	1300	0.38	0.113	0.113	8.87	8.87	-28.0	-34.0	-36.0	19.3	16.8	13.1	0.19
910630	1900	0.40	0.113	0.113	8.87	8.87	-28.0	-30.0	-41.9	23.2	16.8	12.1	0.25
910701	0100	0.32	0.113	0.113	8.87	8.87	-28.0	-28.0	-35.5	20.3	20.3	13.3	0.21
910701	0700	0.32	0.123	0.123	8.16	8.16	-30.0	-30.0	-37.6	20.9	20.9	12.6	0.21
910702	0700	0.39	0.142	0.201	7.04	4.98	-40.0	-40.0	-13.3	61.1	41.5	32.2	0.17
910702	1300	0.34	0.113	0.103	8.87	9.71	-36.0	-44.0	-40.6	50.6	46.7	33.8	0.20
910702	1900	0.41	0.123	0.113	8.16	8.87	-38.0	-54.0	-42.7	24.5	15.6	15.4	0.21
910703	0100	0.44	0.162	0.162	6.19	6.19	-44.0	-42.0	-22.4	25.6	34.7	9.9	0.21
910703	0700	0.55	0.171	0.171	5.83	5.83	-48.0	-42.0	-42.2	18.3	16.5	12.0	0.16
910703	1300	0.50	0.113	0.113	8.87	8.87	-30.0	-42.0	-43.2	19.4	14.3	13.4	0.19
910703	1900	0.52	0.123	0.123	8.16	8.16	-38.0	-42.0	-39.5	15.7	14.0	12.7	0.20
910704	0100	0.50	0.132	0.123	7.56	8.16	-36.0	-44.0	-39.5	18.6	15.8	14.5	0.20
910704	0700	0.69	0.132	0.279	7.56	3.59	-32.0	-40.0	-15.7	41.2	24.4	23.9	0.14
910704	1300	0.49	0.142	0.132	7.04	7.56	-42.0	-42.0	-1.1	77.3	47.7	15.3	0.19
910704	1900	0.51	0.142	0.132	7.04	7.56	-44.0	32.0	8.1	72.4	38.7	13.4	0.19
910705	0100	0.50	0.142	0.142	7.04	7.04	-44.0	-44.0	-5.3	65.9	59.9	56.5	0.20
910705	0700	0.49	0.064	0.064	15.63	15.63	-12.0	-42.0	-2.2	69.7	61.5	24.4	0.21
910705	1300	0.47	0.064	0.064	15.63	15.63	-14.0	26.0	-9.3	69.6	43.3	22.0	0.24
910705	1900	0.44	0.064	0.064	15.63	15.63	-10.0	-40.0	-14.0	61.0	55.8	25.2	0.26
910706	0100	0.37	0.064	0.064	15.63	15.63	-12.0	-46.0	-40.1	57.7	54.7	27.7	0.22
910706	0700	0.41	0.162	0.064	6.19	15.63	-52.0	20.0	-14.3	66.2	62.9	28.3	0.22
910706	1300	0.44	0.074	0.074	13.56	13.56	-14.0	22.0	-3.4	63.7	60.5	18.2	0.20
910706	1900	0.40	0.074	0.074	13.56	13.56	-14.0	-12.0	-30.2	57.3	58.4	27.3	0.24
910707	0100	0.48	0.093	0.103	10.72	9.71	-14.0	-16.0	-19.9	43.4	48.8	29.3	0.18
910707	0700	0.50	0.103	0.103	9.71	9.71	-16.0	14.0	2.3	37.1	40.5	28.7	0.16
910708	0700	0.43	0.113	0.113	8.87	8.87	-14.0	-12.0	-19.4	41.0	43.2	37.0	0.18
910708	1300	0.46	0.123	0.113	8.16	8.87	-40.0	-12.0	-17.9	40.6	37.8	30.9	0.20
910708	1900	0.48	0.083	0.113	11.98	8.87	-14.0	-14.0	-20.4	33.9	34.8	37.6	0.20
910709	0100	0.48	0.083	0.103	11.98	9.71	-10.0	-12.0	-17.2	34.4	33.5	31.9	0.18
910709	0700	0.53	0.103	0.103	9.71	9.71	-14.0	-14.0	-3.1	55.9	28.7	21.9	0.17
910709	1300	0.55	0.113	0.113	8.87	8.87	-18.0	-16.0	23.8	77.0	34.9	32.3	0.20
910709	1900	0.47	0.113	0.103	8.87	9.71	-38.0	58.0	14.7	72.4	34.2	36.5	0.17
910710	0100	0.45	0.093	0.093	10.72	10.72	-8.0	-26.0	-4.4	52.2	32.1	27.7	0.17
910710	0700	0.45	0.093	0.093	10.72	10.72	-16.0	-16.0	-13.2	45.2	43.4	26.1	0.17
910710	1300	0.59	0.220	0.103	4.54	9.71	50.0	48.0	6.7	60.7	32.9	28.9	0.15
910710	1900	0.41	0.093	0.093	10.72	10.72	-12.0	-14.0	-9.3	51.7	35.5	25.4	0.20
910711	0100	0.36	0.103	0.103	9.71	9.71	-16.0	-26.0	-13.9	38.2	37.7	31.7	0.21
910711	0700	0.34	0.103	0.103	9.71	9.71	-14.0	-18.0	-20.1	39.5	40.8	34.6	0.22
910711	1300	0.35	0.093	0.103	10.72	9.71	-26.0	-26.0	-29.8	36.9	34.5	31.3	0.20
910711	1900	0.37	0.083	0.093	11.98	10.72	-24.0	-26.0	-35.0	47.7	43.2	34.4	0.22

(Sheet 32 of 37)

Table A1 (Continued)

Date	Time EST	$H_m$ m	$f_{p,FD}$ Hz	$f_{p,FS}$ Hz	$T_{p,FD}$ sec	$T_{p,FS}$ sec	$\theta_{p,FD}$ deg	$\theta_{p,FS}$ deg	$\theta_{p,SW}$ deg	$\Delta\theta_{FS}$ deg	$\Delta\theta_{SW}$ deg	$\Delta\theta_{FD}$ deg	$x$
910712	0100	0.57	0.259	0.259	3.86	3.86	4.0	4.0	-11.5	30.5	27.9	16.9	0.11
910712	0700	0.47	0.250	0.093	4.01	10.72	4.0	4.0	-18.1	36.5	29.4	30.8	0.16
910712	1300	0.45	0.093	0.093	10.72	10.72	-18.0	-18.0	-31.2	38.5	36.0	31.8	0.14
910712	1900	0.53	0.103	0.103	9.71	9.71	-26.0	-42.0	-39.4	31.2	29.9	22.4	0.17
910713	0100	0.53	0.181	0.201	5.52	4.98	-42.0	-42.0	-41.2	31.1	30.1	32.5	0.15
910713	0700	0.51	0.220	0.093	4.54	10.72	-48.0	-50.0	-34.6	31.7	25.2	25.1	0.19
910713	1300	0.51	0.181	0.171	5.52	5.83	-20.0	-22.0	-30.0	29.1	22.0	18.6	0.12
910713	1900	0.50	0.181	0.191	5.52	5.24	-8.0	-30.0	-25.9	32.1	28.3	26.8	0.17
910714	0100	0.32	0.123	0.113	8.16	8.87	-36.0	-38.0	-32.1	30.8	28.6	21.6	0.17
910714	0700	0.30	0.113	0.113	8.87	8.87	-36.0	-44.0	-39.8	33.4	29.1	15.7	0.23
910714	1300	0.32	0.123	0.123	8.16	8.16	-40.0	-40.0	-39.4	28.4	31.0	14.9	0.19
910714	1900	0.48	0.142	0.142	7.04	7.04	-42.0	-44.0	-35.7	19.3	28.4	11.2	0.21
910715	0100	0.52	0.123	0.123	8.16	8.16	-30.0	-42.0	8.9	75.7	46.6	12.4	0.15
910715	0700	0.53	0.142	0.123	7.04	8.16	-48.0	-48.0	-22.2	56.3	27.1	17.1	0.20
910715	1300	0.52	0.132	0.132	7.56	7.56	-34.0	-32.0	-21.8	45.7	28.5	20.8	0.21
910715	1900	0.57	0.142	0.142	7.04	7.04	-42.0	-42.0	-18.4	43.8	26.9	16.8	0.16
910716	0100	0.62	0.103	0.103	9.71	9.71	-30.0	-28.0	-21.3	35.4	29.9	17.4	0.14
910716	0700	0.73	0.113	0.113	8.87	8.87	-18.0	-20.0	-16.2	37.0	31.1	25.6	0.14
910716	1300	0.73	0.113	0.113	8.87	8.87	-30.0	-20.0	-14.9	35.8	28.4	21.4	0.14
910716	1900	0.67	0.113	0.113	8.87	8.87	-26.0	-16.0	-24.3	28.1	28.1	22.5	0.15
910717	0100	0.59	0.113	0.113	8.87	8.87	-32.0	-28.0	-20.9	33.7	37.0	21.8	0.16
910717	0700	0.59	0.113	0.113	8.87	8.87	-36.0	-28.0	-31.2	26.4	27.2	25.2	0.14
910717	1300	0.54	0.113	0.113	8.87	8.87	-30.0	-28.0	-26.1	25.8	25.7	22.9	0.16
910717	1900	0.48	0.113	0.113	8.87	8.87	-28.0	-28.0	-32.4	22.7	22.5	19.7	0.16
910718	0100	0.46	0.113	0.113	8.87	8.87	-26.0	-30.0	-29.5	21.6	21.6	16.5	0.17
910718	0700	0.39	0.113	0.113	8.87	8.87	-34.0	-28.0	-32.4	23.1	23.2	19.4	0.19
910718	1300	0.37	0.113	0.113	8.87	8.87	-34.0	-40.0	-37.0	23.7	23.5	19.8	0.20
910718	1900	0.39	0.113	0.113	8.87	8.87	-34.0	-38.0	-36.8	20.8	19.7	17.1	0.20
910719	0100	0.39	0.103	0.113	9.71	8.87	-34.0	-34.0	-34.4	19.2	17.8	16.9	0.18
910719	0700	0.39	0.113	0.113	8.87	8.87	-30.0	-32.0	-33.6	17.1	15.9	12.7	0.18
910719	1300	0.37	0.113	0.113	8.87	8.87	-34.0	-36.0	-34.9	19.7	18.5	14.8	0.19
910719	1900	0.40	0.123	0.123	8.16	8.16	-36.0	-38.0	-37.7	19.0	14.9	14.4	0.18
910720	0100	0.39	0.123	0.123	8.16	8.16	-38.0	-32.0	-37.6	17.5	13.8	14.0	0.18
910720	0700	0.35	0.113	0.113	8.87	8.87	-32.0	-38.0	-37.2	19.2	16.8	17.1	0.18
910720	1300	0.35	0.123	0.113	8.16	8.87	-36.0	-42.0	-39.0	24.8	15.3	18.8	0.19
910720	1900	0.36	0.113	0.113	8.87	8.87	-34.0	-54.0	-42.3	25.2	10.8	13.5	0.21
910721	0100	0.31	0.113	0.113	8.87	8.87	-30.0	-30.0	-35.6	22.4	16.9	14.9	0.19
910721	0700	0.31	0.113	0.113	8.87	8.87	-28.0	-40.0	-40.0	27.7	15.1	16.2	0.17
910721	1300	0.31	0.123	0.123	8.16	8.16	-40.0	-42.0	-39.8	28.0	16.8	18.9	0.20
910721	1900	0.27	0.123	0.123	8.16	8.16	-30.0	-42.0	-35.3	24.8	16.8	13.2	0.20
910722	0100	0.30	0.123	0.123	8.16	8.16	-40.0	-42.0	-40.8	25.0	16.7	20.2	0.19
910722	0700	0.30	0.123	0.123	8.16	8.16	-40.0	-40.0	-41.8	24.7	17.7	18.5	0.19
910722	1300	0.34	0.132	0.123	7.56	8.16	-36.0	-44.0	-42.1	23.0	13.3	16.8	0.17
910722	1900	0.29	0.123	0.113	8.16	8.87	-40.0	-40.0	-39.0	19.9	18.4	14.1	0.21
910723	0100	0.31	0.132	0.123	7.56	8.16	-40.0	-42.0	-43.6	24.3	17.6	19.4	0.18
910723	0700	0.31	0.132	0.123	7.56	8.16	-34.0	-34.0	-42.4	24.5	24.6	18.8	0.22
910723	1300	0.30	0.142	0.123	7.04	8.16	-42.0	-42.0	-42.1	21.1	19.1	11.4	0.20
910723	1900	0.33	0.123	0.123	8.16	8.16	-40.0	-44.0	-45.8	21.2	14.1	11.4	0.19
910724	0100	0.31	0.142	0.132	7.04	7.56	-40.0	-40.0	-41.9	20.1	13.2	9.8	0.20
910724	0700	0.31	0.132	0.132	7.56	7.56	-38.0	-38.0	-46.6	24.1	14.6	7.8	0.21
910724	1300	0.38	0.123	0.132	8.16	7.56	-34.0	-42.0	-42.7	20.8	14.5	8.9	0.19
910724	1900	0.42	0.142	0.132	7.04	7.56	-44.0	-44.0	-8.1	81.0	24.5	13.5	0.17

(Sheet 33 of 37)

Table A1 (Continued)

Date	Time EST	$H_m$ m	$f_{p,FD}$ Hz	$f_{p,FS}$ Hz	$T_{p,FD}$ sec	$T_{p,FS}$ sec	$\theta_{p,FD}$ deg	$\theta_{p,DS}$ deg	$\theta_{p,SW}$ deg	$\Delta\theta_{DS}$ deg	$\Delta\theta_{SW}$ deg	$\Delta\theta_{DP}$ deg	$\chi$
910725	0100	0.41	0.142	0.123	7.04	8.16	-42.0	-42.0	-42.8	24.4	28.5	11.1	0.17
910725	0700	0.42	0.123	0.123	8.16	8.16	-30.0	-44.0	-47.2	28.0	33.2	13.6	0.17
910725	1300	0.54	0.308	0.123	3.25	8.16	-62.0	-44.0	-47.0	21.6	14.5	14.0	0.24
910725	1900	0.52	0.132	0.123	7.56	8.16	-38.0	-38.0	-43.5	21.3	15.4	12.4	0.20
910726	0100	0.52	0.132	0.083	7.56	11.98	-30.0	-38.0	-41.3	21.9	16.6	24.1	0.17
910726	0700	0.49	0.123	0.083	8.16	11.98	-34.0	-36.0	-41.2	27.4	19.3	22.6	0.18
910726	1300	0.57	0.201	0.083	4.98	11.98	-50.0	-52.0	-41.0	25.6	16.1	18.8	0.18
910726	1900	0.51	0.142	0.083	7.04	11.98	-42.0	-42.0	-40.4	25.5	17.7	23.9	0.18
910727	0100	0.57	0.162	0.093	6.19	10.72	-44.0	-46.0	-39.8	25.3	14.9	20.2	0.15
910727	0700	0.71	0.171	0.093	5.83	10.72	-48.0	-44.0	-41.9	22.4	16.1	23.9	0.19
910727	1300	0.54	0.152	0.093	6.59	10.72	-46.0	-46.0	-35.7	30.3	16.7	19.4	0.16
910727	1900	0.57	0.171	0.093	5.83	10.72	-50.0	-48.0	-40.4	31.2	19.3	24.2	0.18
910728	0100	0.86	0.152	0.162	6.59	6.19	24.0	44.0	31.7	72.3	42.0	33.1	0.12
910728	0700	0.81	0.162	0.162	6.19	6.19	36.0	34.0	29.1	84.0	51.0	80.5	0.18
910728	1300	0.75	0.191	0.181	5.24	5.52	46.0	48.0	21.0	78.2	24.9	19.2	0.14
910728	1900	0.82	0.191	0.191	5.24	5.24	38.0	38.0	9.6	81.8	47.6	57.6	0.24
910729	0100	0.65	0.152	0.201	6.59	4.98	-48.0	-48.0	-8.3	75.4	59.3	90.4	0.20
910729	0700	0.56	0.162	0.064	6.19	15.63	-50.0	-48.0	-14.8	69.3	57.4	25.3	0.23
910729	1300	0.56	0.064	0.064	15.63	15.63	-12.0	-48.0	-25.7	52.6	50.8	24.5	0.21
910729	1900	0.88	0.162	0.162	6.19	6.19	34.0	36.0	17.0	82.3	72.7	84.9	0.20
910730	0100	1.19	0.123	0.123	8.16	8.16	24.0	34.0	18.6	49.5	43.7	23.2	0.14
910730	0700	1.07	0.074	0.123	13.56	8.16	-14.0	28.0	22.2	58.9	52.4	50.3	0.16
910730	1900	0.88	0.074	0.074	13.56	13.56	-12.0	-30.0	-16.0	53.4	51.5	19.5	0.17
910731	0100	0.75	0.074	0.074	13.56	13.56	-14.0	-32.0	-32.9	40.7	42.9	23.7	0.17
910731	0700	0.76	0.074	0.074	13.56	13.56	-12.0	-46.0	-40.9	45.1	44.7	30.3	0.19
910731	1300	0.70	0.113	0.113	8.87	8.87	-16.0	-44.0	-35.7	45.1	41.9	23.4	0.18
910731	1900	0.64	0.123	0.083	8.16	11.98	-30.0	-28.0	-32.1	43.4	31.3	29.0	0.17
910801	0100	0.56	0.123	0.083	8.16	11.98	-30.0	-30.0	-38.3	38.5	36.4	20.7	0.19
910801	0700	0.59	0.083	0.083	11.98	11.98	-24.0	-22.0	-31.3	44.4	45.0	19.6	0.17
910801	1300	0.56	0.083	0.083	11.98	11.98	-22.0	-54.0	-38.4	42.8	29.2	23.9	0.18
910801	1900	0.46	0.152	0.083	6.59	11.98	-44.0	-26.0	-32.3	41.4	31.3	32.7	0.19
910802	0100	0.41	0.083	0.083	11.98	11.98	-22.0	-28.0	-36.3	34.9	25.7	21.9	0.20
910802	0700	0.39	0.083	0.083	11.98	11.98	-22.0	-50.0	-36.2	35.6	24.5	27.6	0.19
910802	1300	0.34	0.083	0.083	11.98	11.98	-20.0	-26.0	-32.6	32.0	20.3	19.0	0.23
910802	1900	0.35	0.083	0.083	11.98	11.98	-14.0	-58.0	-33.9	32.7	17.1	24.6	0.26
910803	0100	0.32	0.142	0.083	7.04	11.98	-40.0	-42.0	-36.1	28.3	16.0	23.3	0.22
910803	0700	0.33	0.123	0.093	8.16	10.72	-38.0	-40.0	-35.7	28.2	14.8	23.2	0.25
910803	1300	0.31	0.123	0.093	8.16	10.72	-36.0	-42.0	-34.9	27.8	18.1	25.7	0.25
910803	1900	0.33	0.142	0.064	7.04	15.63	-42.0	-42.0	-32.8	25.5	16.3	21.1	0.24
910804	0100	0.32	0.132	0.064	7.56	15.63	-40.0	-42.0	-34.3	29.0	21.1	20.0	0.25
910804	0700	0.30	0.064	0.064	15.63	15.63	-10.0	-38.0	-28.9	31.5	22.2	27.6	0.28
910804	1300	0.31	0.074	0.074	13.56	13.56	-14.0	-44.0	-30.3	34.2	23.4	22.0	0.25
910804	1900	0.34	0.064	0.074	15.63	13.56	-12.0	-42.0	-17.0	36.2	25.9	21.3	0.29
910805	0100	0.34	0.074	0.074	13.56	13.56	-14.0	-14.0	-27.2	30.8	24.8	21.4	0.28
910805	0700	0.39	0.074	0.074	13.56	13.56	-12.0	-14.0	-15.3	39.7	25.0	21.4	0.26
910805	1300	0.62	0.230	0.250	4.35	4.01	58.0	60.0	27.0	73.2	30.4	29.9	0.23
910805	1900	0.48	0.074	0.074	13.56	13.56	-14.0	-14.0	1.3	63.1	27.6	21.8	0.22
910806	0100	0.49	0.074	0.074	13.56	13.56	-14.0	-30.0	1.4	56.3	38.9	24.5	0.23
910806	0700	0.48	0.074	0.074	13.56	13.56	-12.0	-12.0	-1.7	49.9	28.0	20.7	0.22
910806	1300	0.50	0.074	0.074	13.56	13.56	-12.0	-12.0	-7.5	40.3	38.2	23.6	0.26
910806	1900	0.46	0.074	0.074	13.56	13.56	-14.0	-14.0	-14.9	34.6	36.4	19.0	0.26
910807	0100	0.52	0.064	0.074	15.63	13.56	-16.0	-16.0	-0.6	41.2	41.8	23.5	0.22

(Sheet 34 of 37)

Table A1 (Continued)

Date	Time EST	H <sub>m</sub> m	f <sub>p,FD</sub> Hz	f <sub>p,FS</sub> Hz	T <sub>p,FD</sub> sec	T <sub>p,FS</sub> sec	θ <sub>p,FD</sub> deg	θ <sub>p,DS</sub> deg	θ <sub>p,SW</sub> deg	Δθ <sub>DS</sub> deg	Δθ <sub>SW</sub> deg	Δθ <sub>FD</sub> deg	X
910807	0700	0.67	0.064	0.074	15.63	13.56	-12.0	-14.0	6.9	40.9	29.6	20.1	0.15
910807	1300	0.76	0.240	0.240	4.17	4.17	-4.0	-16.0	-23.8	38.3	38.7	29.3	0.17
910807	1900	0.58	0.220	0.103	4.54	9.71	-62.0	-14.0	-37.2	50.9	47.2	41.3	0.20
910808	0100	0.58	0.074	0.113	13.56	8.87	-12.0	-14.0	-19.9	39.4	36.6	35.5	0.18
910808	0700	0.57	0.113	0.113	8.87	8.87	-6.0	-10.0	-16.7	36.4	34.5	26.0	0.19
910808	1300	0.53	0.074	0.103	13.56	9.71	-14.0	-12.0	-10.5	31.1	30.4	31.6	0.19
910808	1900	0.61	0.103	0.103	9.71	9.71	-38.0	-22.0	-16.9	29.7	28.9	36.5	0.17
910809	0100	0.60	0.074	0.074	13.56	13.56	-14.0	-16.0	-18.1	29.1	29.9	20.5	0.16
910809	0700	0.62	0.074	0.074	13.56	13.56	-14.0	-24.0	-27.7	30.9	29.7	19.2	0.17
910809	1300	0.66	0.289	0.083	3.47	11.98	-52.0	-52.0	-35.2	32.3	21.5	19.9	0.20
910809	1900	0.81	0.181	0.181	5.52	5.52	-38.0	-24.0	-32.1	23.8	21.9	18.3	0.15
910810	0100	0.61	0.201	0.093	4.98	10.72	-44.0	-24.0	-28.5	26.6	20.2	19.9	0.12
910810	0700	0.53	0.093	0.093	10.72	10.72	-22.0	-14.0	-30.5	30.8	28.3	23.3	0.20
910810	1300	0.49	0.093	0.093	10.72	10.72	-16.0	-16.0	-26.8	28.6	28.3	20.7	0.14
910810	1900	0.46	0.093	0.093	10.72	10.72	-20.0	-42.0	-32.5	30.8	27.9	26.7	0.23
910811	0100	0.46	0.083	0.093	11.98	10.72	-18.0	-36.0	-27.3	24.8	24.2	24.5	0.17
910811	0700	0.51	0.093	0.093	10.72	10.72	-26.0	-26.0	-24.5	28.7	28.9	24.6	0.22
910811	1300	0.68	0.093	0.093	10.72	10.72	-16.0	-22.0	0.8	61.7	23.3	21.8	0.18
910811	1900	0.65	0.093	0.093	10.72	10.72	-20.0	-20.0	-12.5	29.0	25.3	21.3	0.22
910812	0100	0.64	0.093	0.093	10.72	10.72	-22.0	-18.0	-18.1	23.9	23.6	20.5	0.14
910812	0700	0.66	0.093	0.103	10.72	9.71	-10.0	-14.0	-13.4	24.3	24.9	23.8	0.20
910812	1300	0.65	0.103	0.093	9.71	10.72	-18.0	-10.0	-17.2	23.5	24.8	28.6	0.15
910812	1900	0.60	0.103	0.103	9.71	9.71	-18.0	-18.0	-18.9	21.4	23.4	19.3	0.20
910813	0100	0.77	0.210	0.103	4.75	9.71	-50.0	-14.0	-39.6	40.7	30.9	23.1	0.18
910813	0700	0.88	0.240	0.230	4.17	4.35	-14.0	-16.0	-15.0	27.7	26.2	21.3	0.16
910813	1300	0.66	0.201	0.093	4.98	10.72	-24.0	-22.0	-15.5	26.5	25.6	22.8	0.15
910813	1900	0.60	0.240	0.103	4.17	9.71	2.0	-2.0	-9.8	26.7	22.7	25.0	0.15
910814	0100	0.46	0.103	0.103	9.71	9.71	-22.0	0.0	-12.9	33.8	29.0	26.0	9.99
910814	0700	0.38	0.103	0.103	9.71	9.71	-20.0	-20.0	-14.6	37.4	35.0	22.1	0.21
910814	1300	0.33	0.103	0.103	9.71	9.71	-36.0	-22.0	-28.2	35.3	38.7	23.4	0.24
910814	1900	0.36	0.103	0.103	9.71	9.71	-28.0	-26.0	-39.9	36.8	28.8	24.7	0.22
910815	0100	0.33	0.103	0.103	9.71	9.71	-30.0	-58.0	-39.2	39.0	17.3	18.5	0.24
910815	0700	0.28	0.113	0.103	8.87	9.71	-32.0	-32.0	-34.3	31.8	26.8	28.7	0.31
910815	1300	0.29	0.103	0.103	9.71	9.71	-28.0	-50.0	-35.9	32.6	21.7	21.7	0.28
910815	1900	0.30	0.123	0.113	8.16	8.87	-34.0	-34.0	-32.1	27.9	21.7	17.0	0.30
910816	0100	0.29	0.113	0.103	8.87	9.71	-32.0	-30.0	-26.1	23.8	22.8	18.3	0.32
910816	0700	0.29	0.113	0.113	8.87	8.87	-26.0	-24.0	-25.1	24.6	24.2	19.4	0.27
910816	1300	0.32	0.113	0.113	8.87	8.87	-32.0	-30.0	-28.5	23.5	20.8	18.3	0.31
910816	1900	0.35	0.113	0.074	8.87	13.56	-28.0	-26.0	-26.7	22.0	19.7	18.1	0.30
910817	0100	0.35	0.113	0.113	8.87	8.87	-14.0	-26.0	-21.8	23.1	23.9	18.9	0.25
910817	0700	0.37	0.113	0.113	8.87	8.87	-18.0	-24.0	-25.7	22.4	19.6	17.7	0.25
910817	1300	0.37	0.123	0.123	8.16	8.16	-28.0	-28.0	-28.5	24.6	19.9	14.9	0.27
910817	1600	0.40	0.074	0.113	13.56	8.87	-14.0	-28.0	-31.7	24.4	18.3	20.7	0.27
910817	1900	0.44	0.123	0.113	8.16	8.87	-26.0	-26.0	-33.1	24.5	20.9	16.8	0.23
910817	2200	0.45	0.142	0.113	7.04	8.87	-42.0	-42.0	-39.3	26.2	23.2	17.8	0.23
910818	0100	0.54	0.152	0.132	6.59	7.56	-44.0	-44.0	-39.4	25.2	21.3	17.4	0.21
910818	0400	0.66	0.152	0.152	6.59	6.59	-42.0	-44.0	-43.9	22.4	21.6	10.6	0.18
910818	0700	0.69	0.142	0.152	7.04	6.59	-42.0	-42.0	-41.1	19.9	19.1	14.5	0.18
910818	1600	1.26	0.074	0.074	13.56	13.56	-32.0	-36.0	-35.6	22.2	20.4	14.3	0.22
910818	1900	1.97	0.074	0.074	13.56	13.56	-32.0	-32.0	-27.9	25.8	24.5	13.5	0.15
910818	2200	3.59	0.064	0.064	15.63	15.63	-32.0	-30.0	-14.3	47.0	28.3	9.7	0.16
910819	0100	3.02	0.152	0.142	6.59	7.04	32.0	34.0	14.5	46.0	21.6	16.7	0.15
910819	0400	2.12	0.132	0.132	7.56	7.56	20.0	22.0	15.2	30.8	21.5	13.4	0.13

(Sheet 35 of 37)

Table A1 (Continued)

Date	Time EST	H <sub>m</sub> m	f <sub>p,FD</sub> Hz	f <sub>p,FS</sub> Hz	T <sub>p,FD</sub> sec	T <sub>p,FS</sub> sec	θ <sub>p,FD</sub> deg	θ <sub>p,FS</sub> deg	θ <sub>p,mv</sub> deg	Δθ <sub>DS</sub> deg	Δθ <sub>mv</sub> deg	Δθ <sub>for</sub> deg	x
910819	0700	1.50	0.123	0.123	8.16	8.16	22.0	22.0	12.7	33.2	22.9	17.9	0.12
910819	1000	1.16	0.123	0.113	8.16	8.87	10.0	26.0	8.0	42.5	33.1	39.1	0.14
910819	1300	1.02	0.142	0.132	7.04	7.56	28.0	28.0	5.6	58.6	48.2	32.4	0.18
910819	1600	1.00	0.123	0.113	8.16	8.87	20.0	30.0	-19.8	67.4	52.8	47.3	0.19
910819	1900	0.96	0.123	0.123	8.16	8.16	10.0	14.0	-24.2	64.4	57.8	45.6	0.17
910819	2200	0.88	0.142	0.132	7.04	7.56	-40.0	-40.0	-27.9	52.1	45.2	47.6	0.14
910820	0100	0.86	0.152	0.132	6.59	7.56	-44.0	-44.0	-35.2	45.8	36.9	48.1	0.15
910820	0400	0.76	0.152	0.142	6.59	7.04	-46.0	-44.0	-37.1	42.7	37.3	43.7	0.16
910820	0700	0.65	0.162	0.132	6.19	7.56	-46.0	-42.0	-37.5	43.9	34.7	46.8	0.16
910820	1000	0.69	0.171	0.123	5.83	8.16	-46.0	-54.0	-43.1	30.3	25.4	35.0	0.18
910820	1300	0.70	0.162	0.132	6.19	7.56	-44.0	-52.0	-44.0	25.5	17.6	24.8	0.24
910820	1600	0.60	0.152	0.123	6.59	8.16	-42.0	-50.0	-37.4	34.4	18.2	30.4	0.24
910820	1900	0.58	0.142	0.123	7.04	8.16	-40.0	-40.0	-31.4	27.4	22.5	31.6	0.19
910820	2200	0.59	0.132	0.132	7.56	7.56	-38.0	-38.0	-40.4	21.2	20.3	18.8	0.16
910821	0100	0.62	0.142	0.142	7.04	7.04	-44.0	-44.0	-43.6	21.4	21.7	14.8	0.16
910821	0700	0.54	0.152	0.152	6.59	6.59	-46.0	-46.0	-44.6	24.2	23.5	18.2	0.17
910821	1000	0.48	0.162	0.152	6.19	6.59	-46.0	-44.0	-42.8	27.7	25.9	18.5	0.18
910821	1300	0.49	0.162	0.152	6.19	6.59	-42.0	-44.0	-42.1	28.8	25.9	19.9	0.20
910821	1600	0.52	0.142	0.142	7.04	7.04	-46.0	-46.0	-46.0	28.2	26.3	23.8	0.19
910821	1900	0.50	0.152	0.152	6.59	6.59	-46.0	-46.0	-41.5	28.0	28.0	20.0	0.20
910821	2200	0.48	0.152	0.152	6.59	6.59	-26.0	-30.0	-40.5	23.3	24.6	21.4	0.16
910822	0100	0.56	0.142	0.142	7.04	7.04	-42.0	-44.0	-38.2	21.1	21.8	18.0	0.17
910822	0400	0.50	0.132	0.142	7.56	7.04	-38.0	-34.0	-41.7	25.6	24.7	19.7	0.19
910822	0700	0.47	0.142	0.142	7.04	7.04	-42.0	-42.0	-39.1	29.7	28.8	19.0	0.21
910822	1000	0.49	0.142	0.152	7.04	6.59	-42.0	-44.0	-41.1	26.7	27.6	17.5	0.19
910822	1300	0.55	0.152	0.152	6.59	6.59	-44.0	-44.0	-38.5	24.2	25.2	14.2	0.22
910822	1600	0.63	0.152	0.152	6.59	6.59	-46.0	-34.0	-39.2	22.4	24.7	15.9	0.23
910822	1900	0.57	0.162	0.152	6.19	6.59	-52.0	-46.0	-44.0	30.6	26.5	23.1	0.23
910822	2200	0.48	0.152	0.162	6.59	6.19	-42.0	-42.0	-41.3	34.0	31.3	28.1	0.19
910823	0100	0.46	0.162	0.162	6.19	6.19	-36.0	-34.0	-35.2	28.2	27.8	13.7	0.20
910823	0400	0.42	0.152	0.093	6.59	10.72	-38.0	-38.0	-33.9	31.8	30.2	34.3	0.24
910823	0700	0.41	0.142	0.103	7.04	9.71	-42.0	-42.0	-34.8	36.8	36.0	37.3	0.23
910823	1300	0.44	0.103	0.103	9.71	9.71	-32.0	-36.0	-34.3	28.6	28.9	19.8	0.21
910823	1900	0.52	0.103	0.103	9.71	9.71	-28.0	-42.0	-46.1	31.5	27.9	18.1	0.20
910824	0100	0.48	0.103	0.103	9.71	9.71	-36.0	-18.0	-35.5	30.9	29.2	24.5	0.19
910824	0700	0.47	0.113	0.103	8.87	9.71	-38.0	-40.0	-37.4	34.6	33.0	23.5	0.22
910824	1300	0.52	0.113	0.113	8.87	8.87	-20.0	-18.0	-39.2	31.5	30.4	20.4	0.17
910824	1900	0.46	0.103	0.103	9.71	9.71	-20.0	-18.0	-34.8	35.7	36.7	26.2	0.21
910825	0100	0.57	0.259	0.083	3.86	11.98	48.0	50.0	15.2	64.2	33.3	20.3	0.15
910825	0700	1.25	0.201	0.191	4.98	5.24	28.0	28.0	28.7	31.6	27.3	27.3	0.15
910825	1300	1.62	0.162	0.162	6.19	6.19	14.0	16.0	21.8	24.8	21.1	14.4	0.13
910825	1600	1.98	0.152	0.162	6.59	6.19	16.0	14.0	24.5	29.2	23.2	21.3	0.15
910825	1900	2.13	0.152	0.162	6.59	6.19	18.0	16.0	22.9	30.1	24.5	23.6	0.16
910825	2200	1.97	0.152	0.152	6.59	6.59	20.0	18.0	23.5	31.2	25.9	18.7	0.14
910826	0100	1.72	0.142	0.142	7.04	7.04	18.0	18.0	22.6	30.9	27.3	27.1	0.11
910826	0700	1.36	0.123	0.123	8.16	8.16	14.0	14.0	19.2	36.5	32.5	25.8	0.13
910826	1300	1.27	0.103	0.103	9.71	9.71	4.0	4.0	13.9	33.9	31.7	27.4	0.11
910826	1900	1.16	0.113	0.113	8.87	8.87	6.0	0.0	7.4	31.3	34.2	22.1	0.14
910827	0100	1.09	0.132	0.113	7.56	8.87	0.0	0.0	4.3	33.5	36.8	29.4	0.12
910827	0700	1.13	0.123	0.123	8.16	8.16	-10.0	-10.0	-6.8	30.3	33.1	18.1	0.15
910827	1300	0.93	0.123	0.123	8.16	8.16	-8.0	-8.0	-14.8	29.9	29.6	18.8	0.12
910827	1900	0.83	0.123	0.123	8.16	8.16	-12.0	-12.0	-19.6	33.5	33.0	25.6	0.17
910828	0100	0.82	0.113	0.113	8.87	8.87	-16.0	-14.0	-20.2	28.8	29.1	19.7	0.12
910828	0700	0.86	0.103	0.103	9.71	9.71	-12.0	-14.0	-24.3	31.3	26.8	13.3	0.16
910828	1300	0.70	0.103	0.103	9.71	9.71	-10.0	-10.0	-16.3	34.0	27.7	24.5	0.13
910828	1900	0.67	0.093	0.103	10.72	9.71	-12.0	-14.0	-19.1	34.5	30.0	27.0	0.18

(Sheet 36 of 37)

**Table A1 (Concluded)**

Date	Time EST	$H_{ms}$ m	$f_{p,FD}$ Hz	$f_{p,FS}$ Hz	$T_{p,FD}$ sec	$T_{p,FS}$ sec	$\theta_{p,FD}$ deg	$\theta_{p,DS}$ deg	$\theta_{p,SW}$ deg	$\Delta\theta_{DS}$ deg	$\Delta\theta_{SW}$ deg	$\Delta\theta_{PDF}$ deg	$\chi$
910829	0100	0.66	0.103	0.103	9.71	9.71	-12.0	-14.0	-18.4	29.1	28.9	27.3	0.14
910829	0700	0.60	0.093	0.093	10.72	10.72	-10.0	-12.0	-14.4	34.1	28.6	31.5	0.18
910829	1300	0.54	0.083	0.083	11.98	11.98	-22.0	-18.0	-23.1	33.4	31.3	26.7	0.19
910829	1900	0.62	0.093	0.093	10.72	10.72	-16.0	-16.0	-20.6	27.6	26.0	26.3	0.19
910830	0100	0.53	0.083	0.083	11.98	11.98	-14.0	-20.0	-20.9	25.5	25.4	24.9	0.18
910830	0700	0.50	0.083	0.083	11.98	11.98	-14.0	-18.0	-24.3	31.0	30.2	26.9	0.21
910830	1300	0.51	0.093	0.093	10.72	10.72	-26.0	-26.0	-28.9	28.6	29.2	24.7	0.23
910830	1900	0.53	0.093	0.093	10.72	10.72	-14.0	-26.0	-23.3	26.6	25.2	24.8	0.22
910831	0100	0.49	0.093	0.093	10.72	10.72	-18.0	-22.0	-28.0	26.6	25.6	21.1	0.22
910831	0700	0.47	0.103	0.093	9.71	10.72	-26.0	-26.0	-25.4	24.1	23.0	22.6	0.22
910831	1300	0.47	0.093	0.093	10.72	10.72	-20.0	-24.0	-24.8	24.1	25.2	23.1	0.23
910831	1900	0.48	0.093	0.093	10.72	10.72	-16.0	-20.0	-27.2	27.0	20.3	25.3	0.24

(Sheet 37 of 37)

# **Appendix B**

## **Time Series Graphs of Bulk Parameters**

---

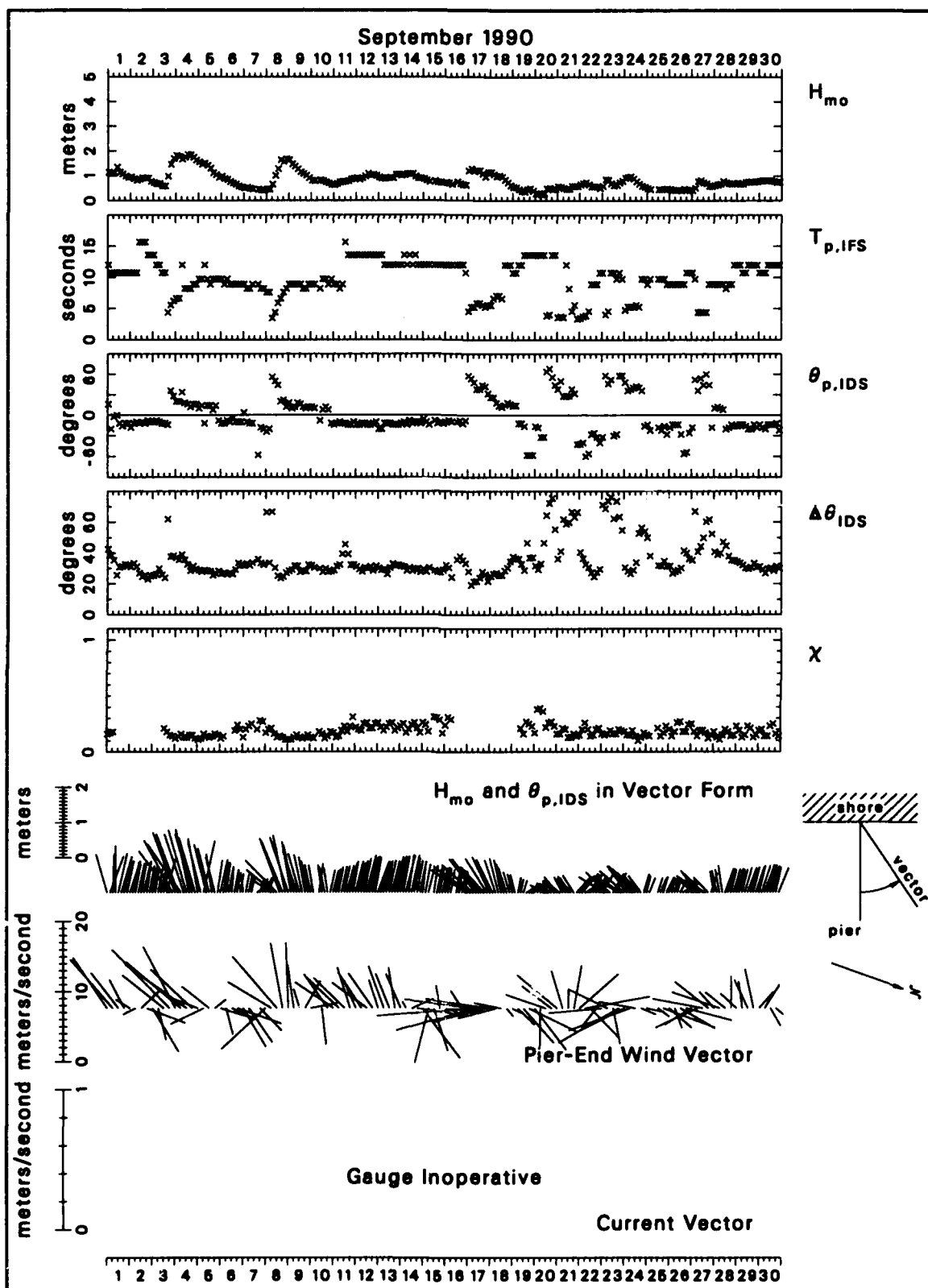


Figure B1. Bulk data for September 1990

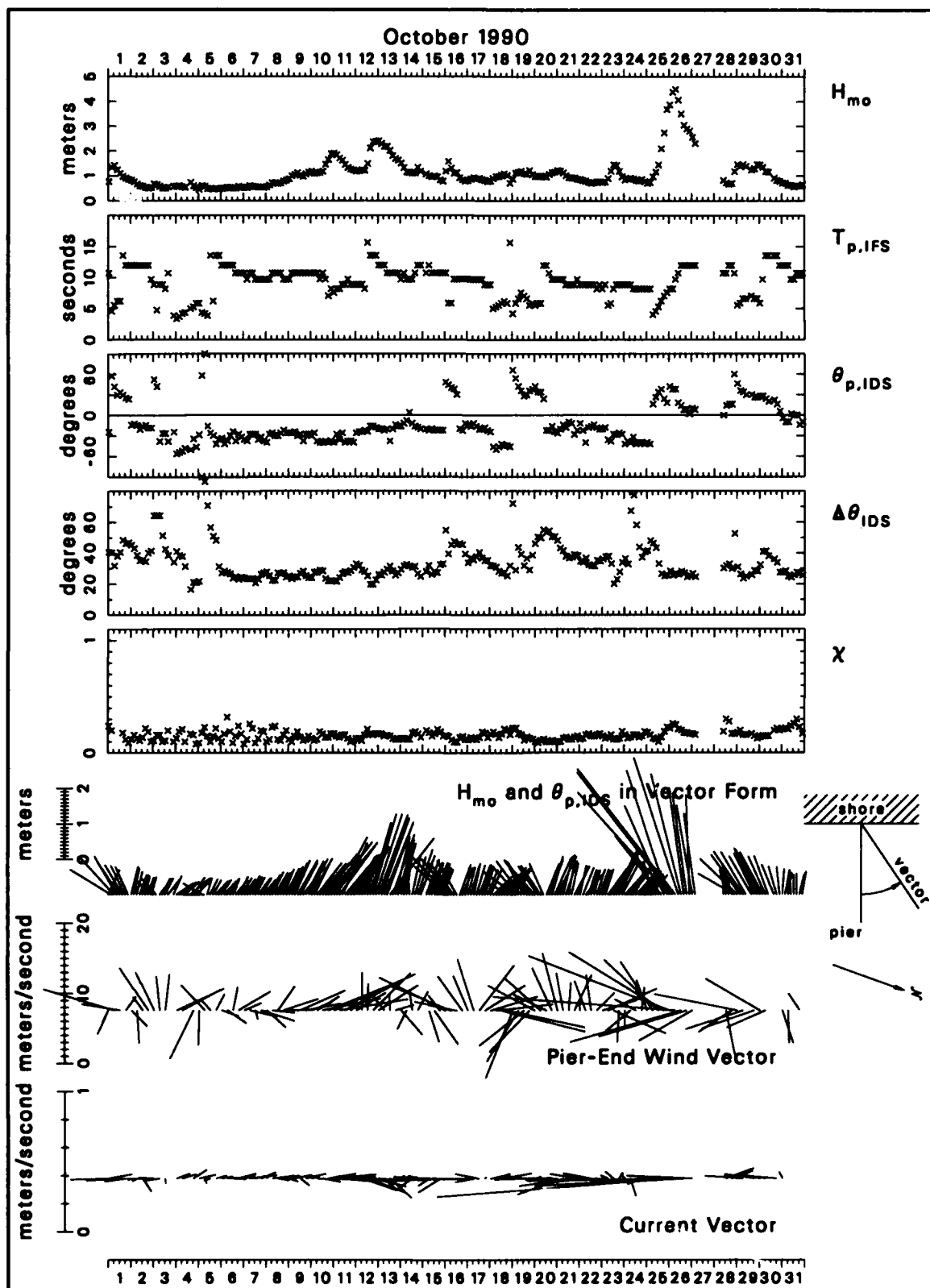


Figure B2. Bulk data for October 1990

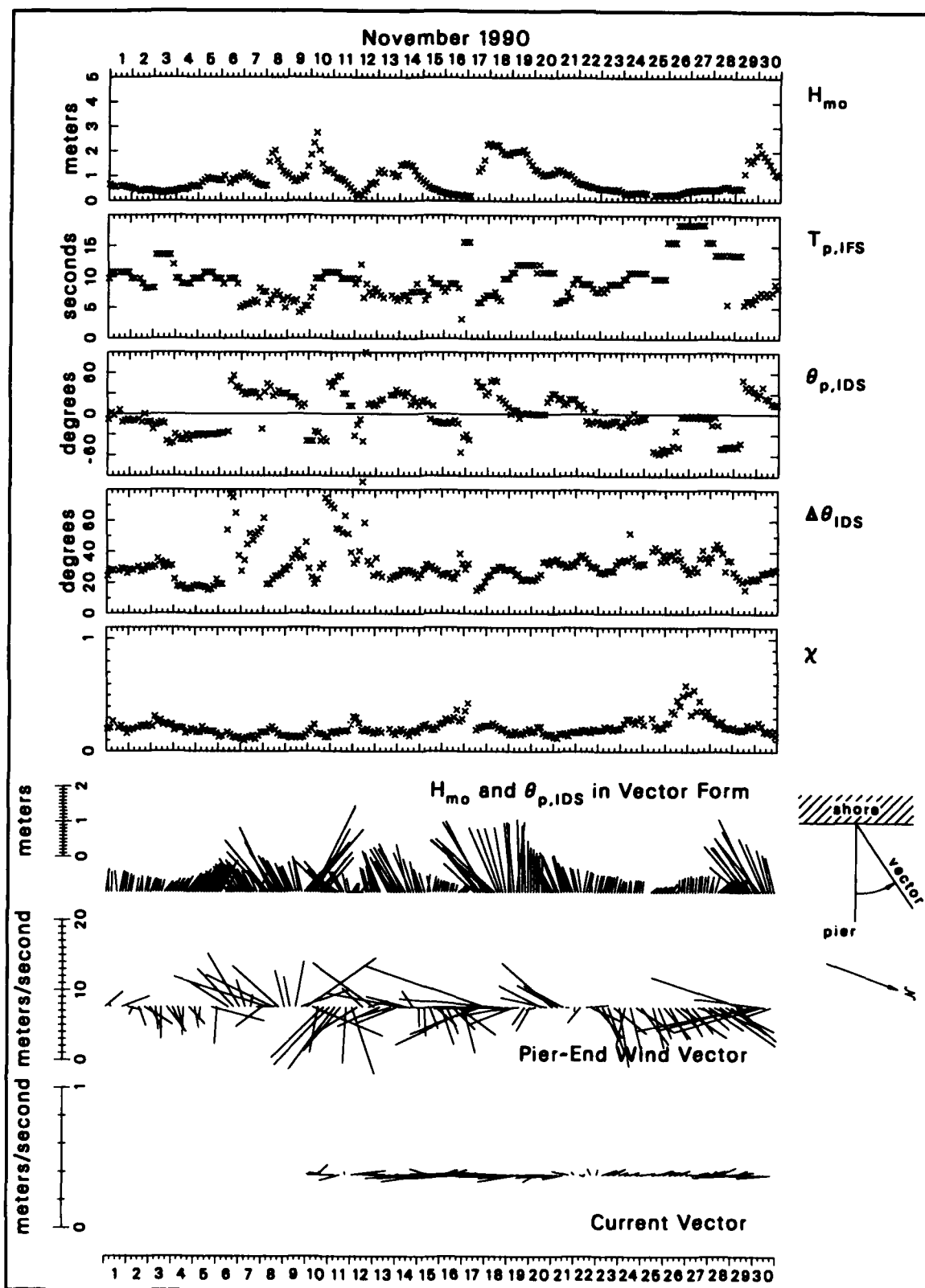


Figure B3. Bulk data for November 1990

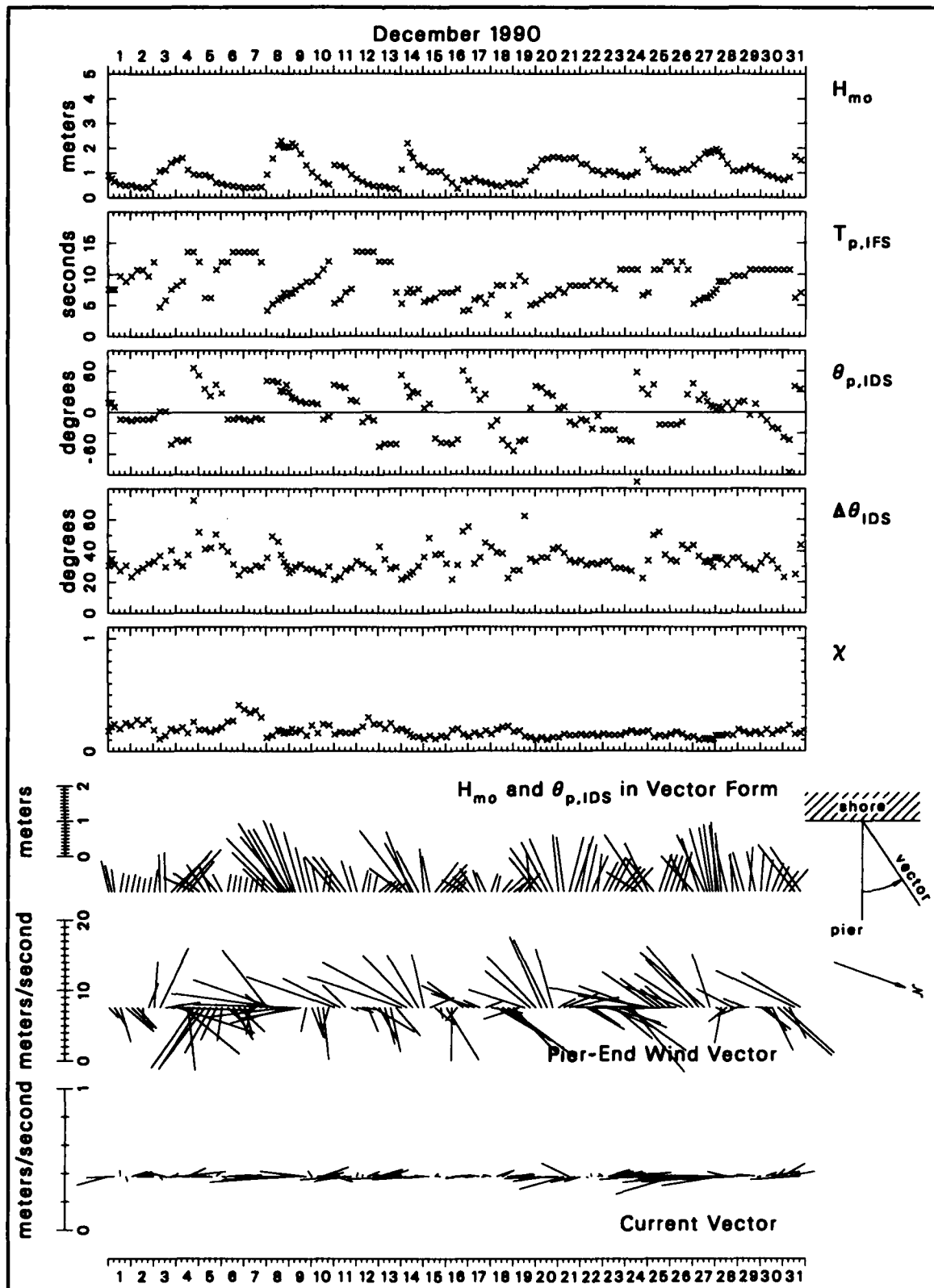


Figure B4. Bulk data for December 1990

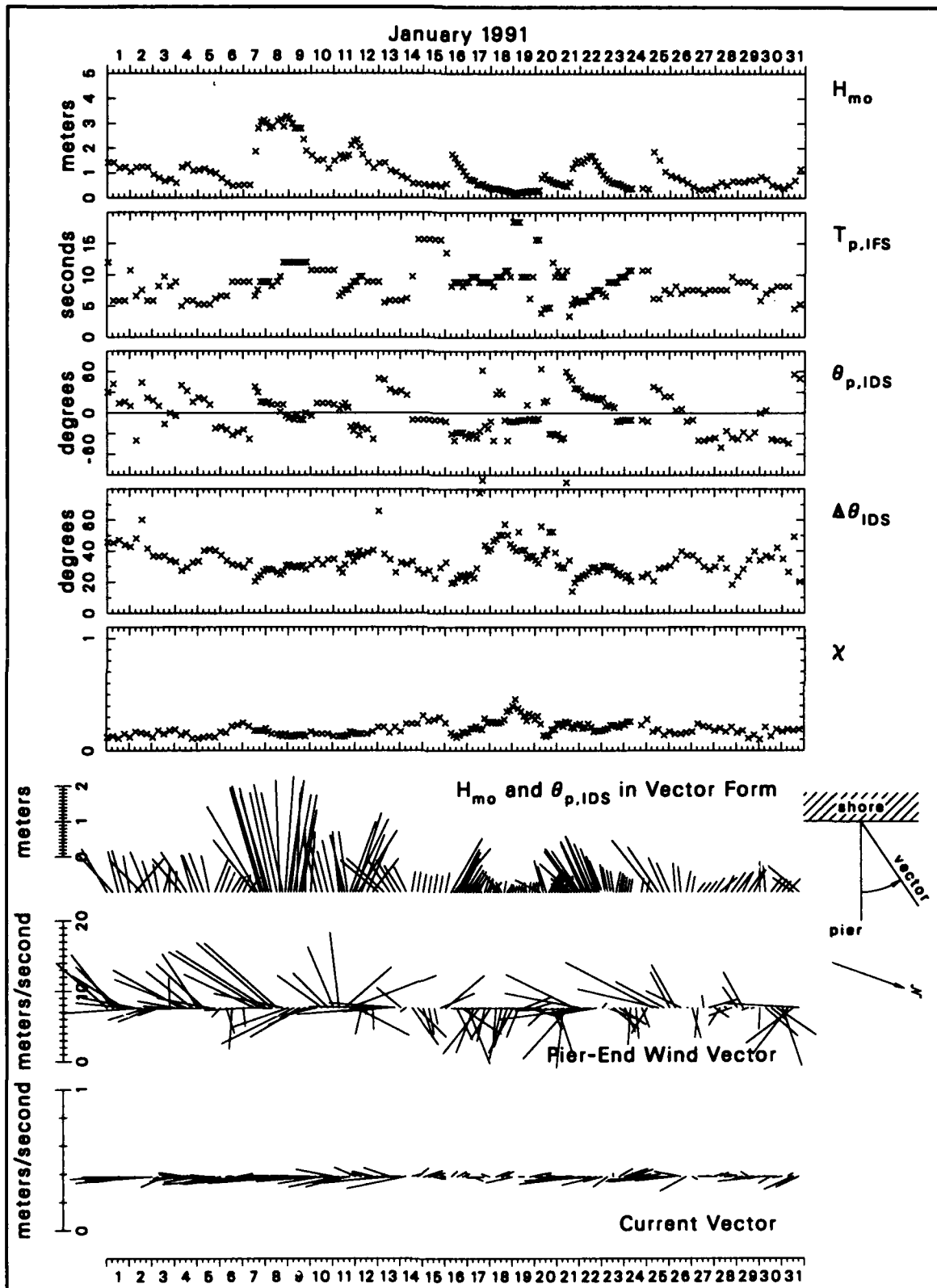


Figure B5. Bulk data for January 1991

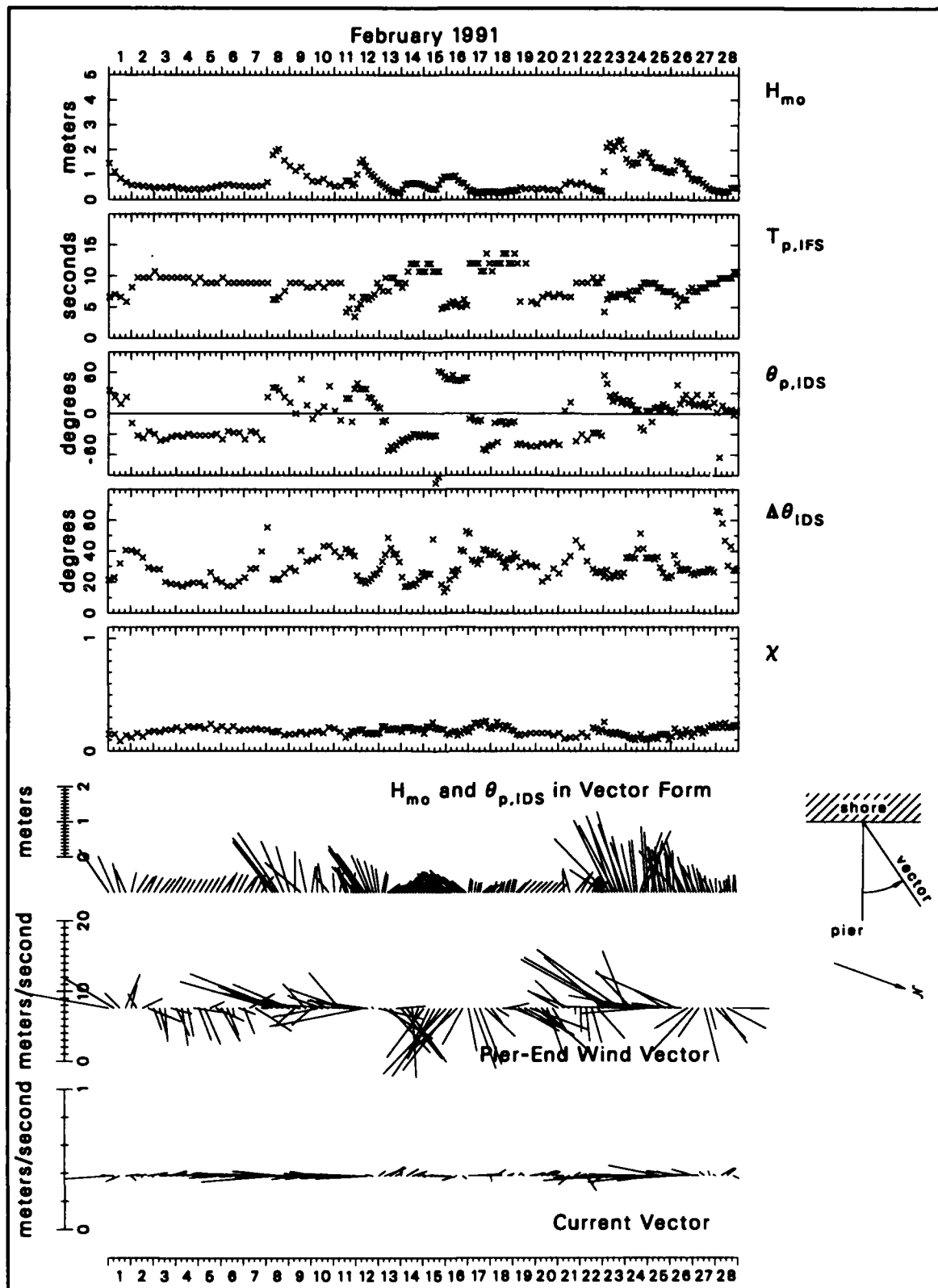


Figure B6. Bulk data for February 1991

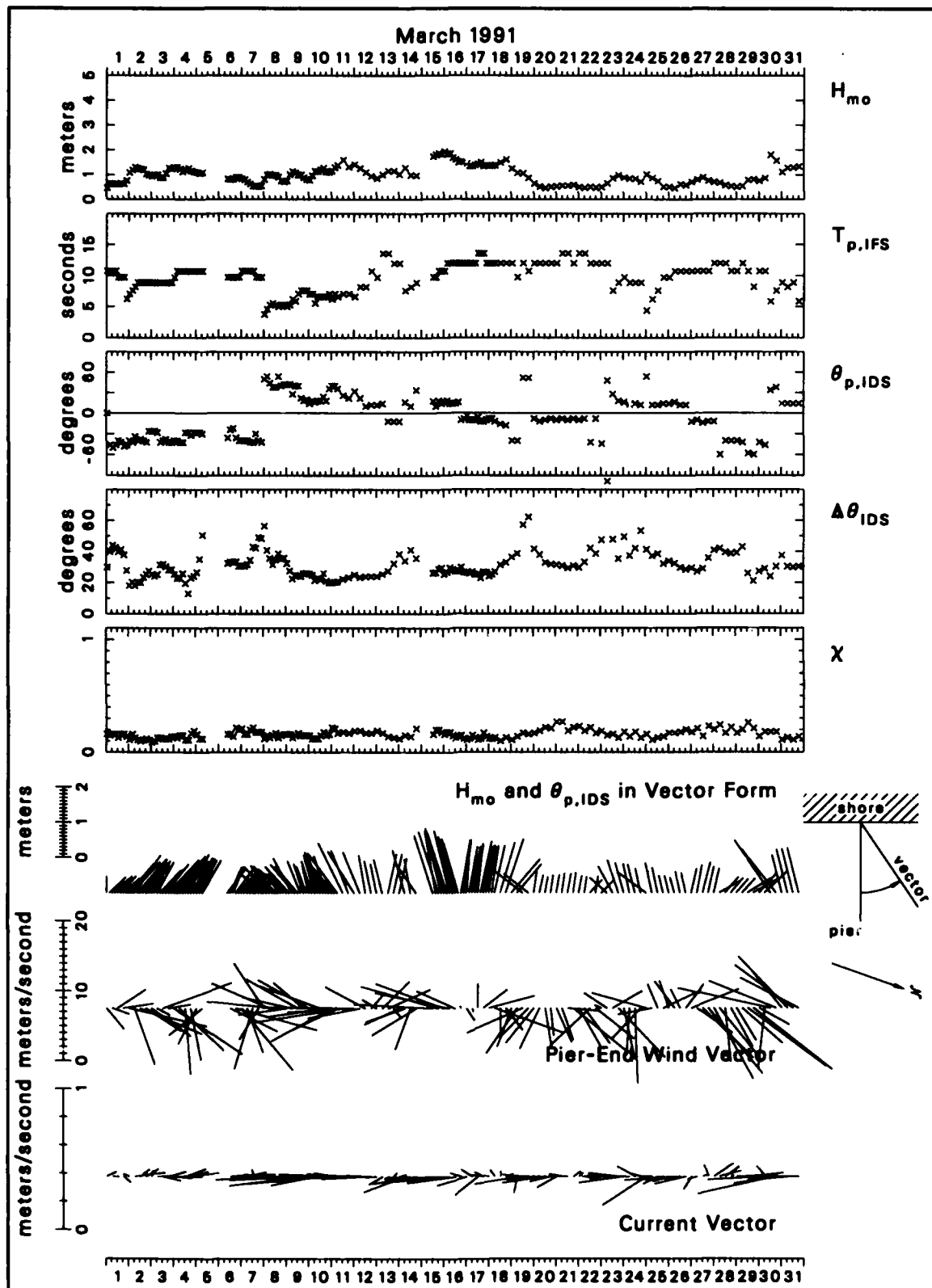


Figure B7. Bulk data for March 1991

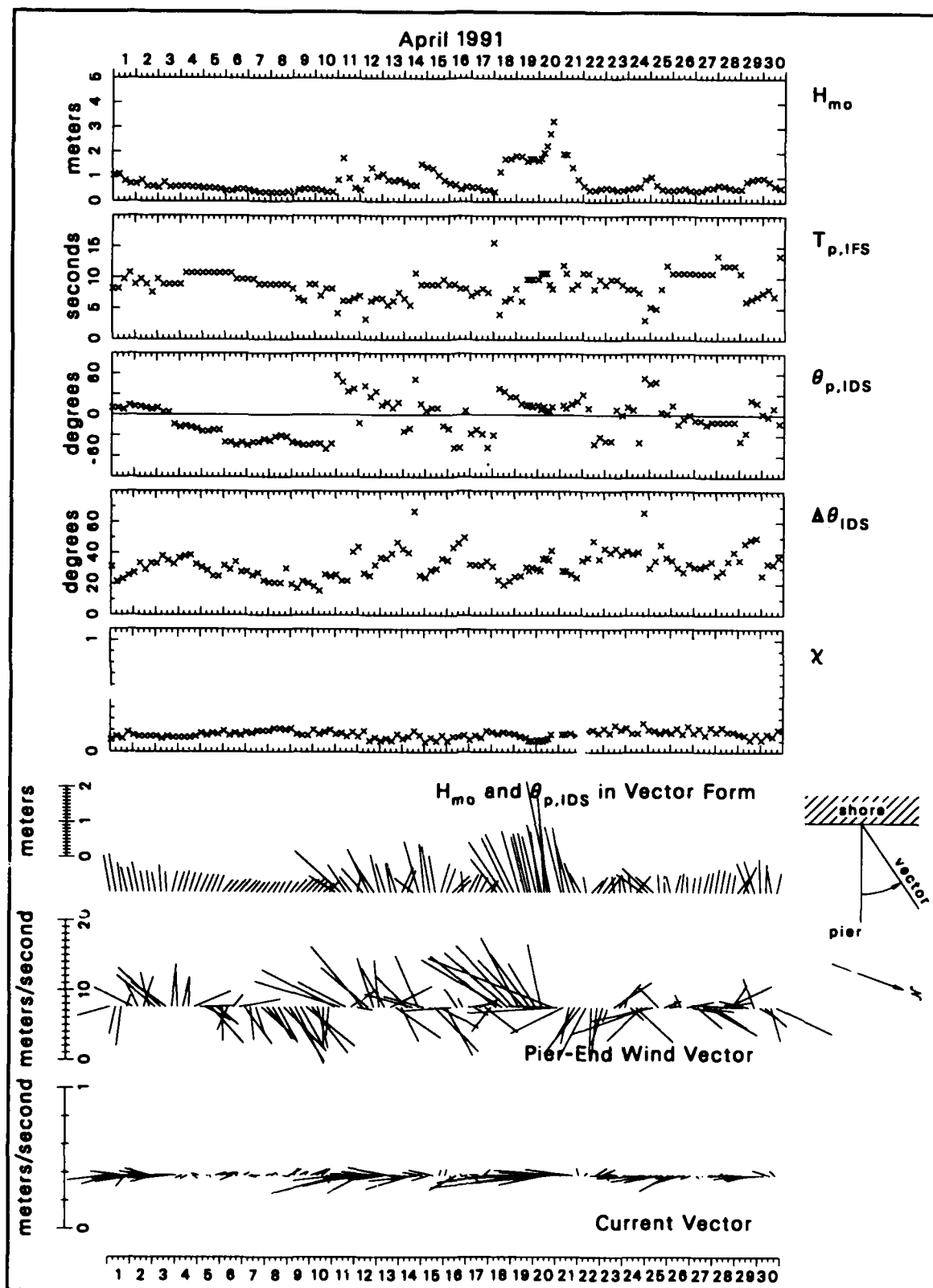


Figure B8. Bulk data for April 1991



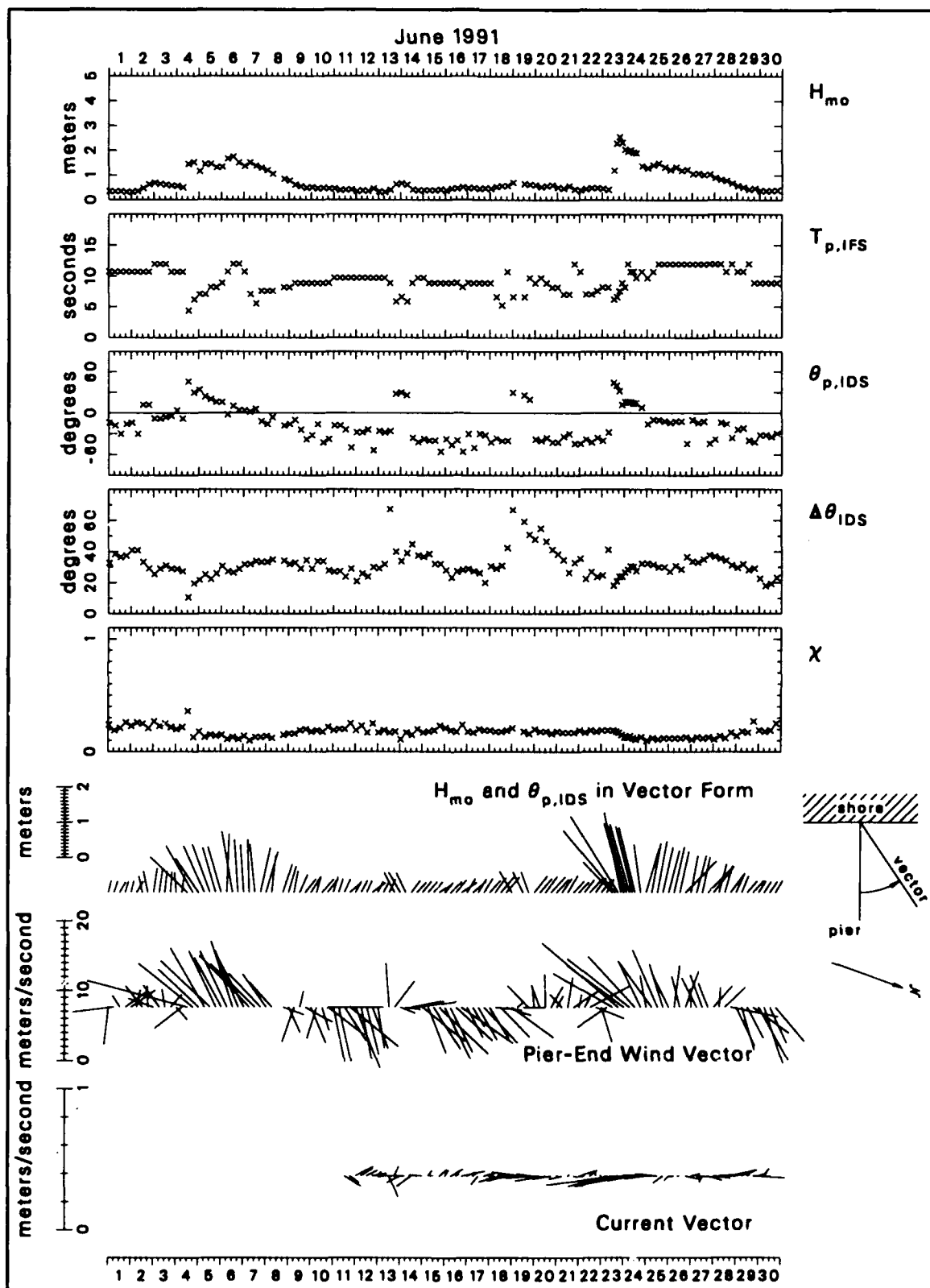


Figure B10. Bulk data for June 1991

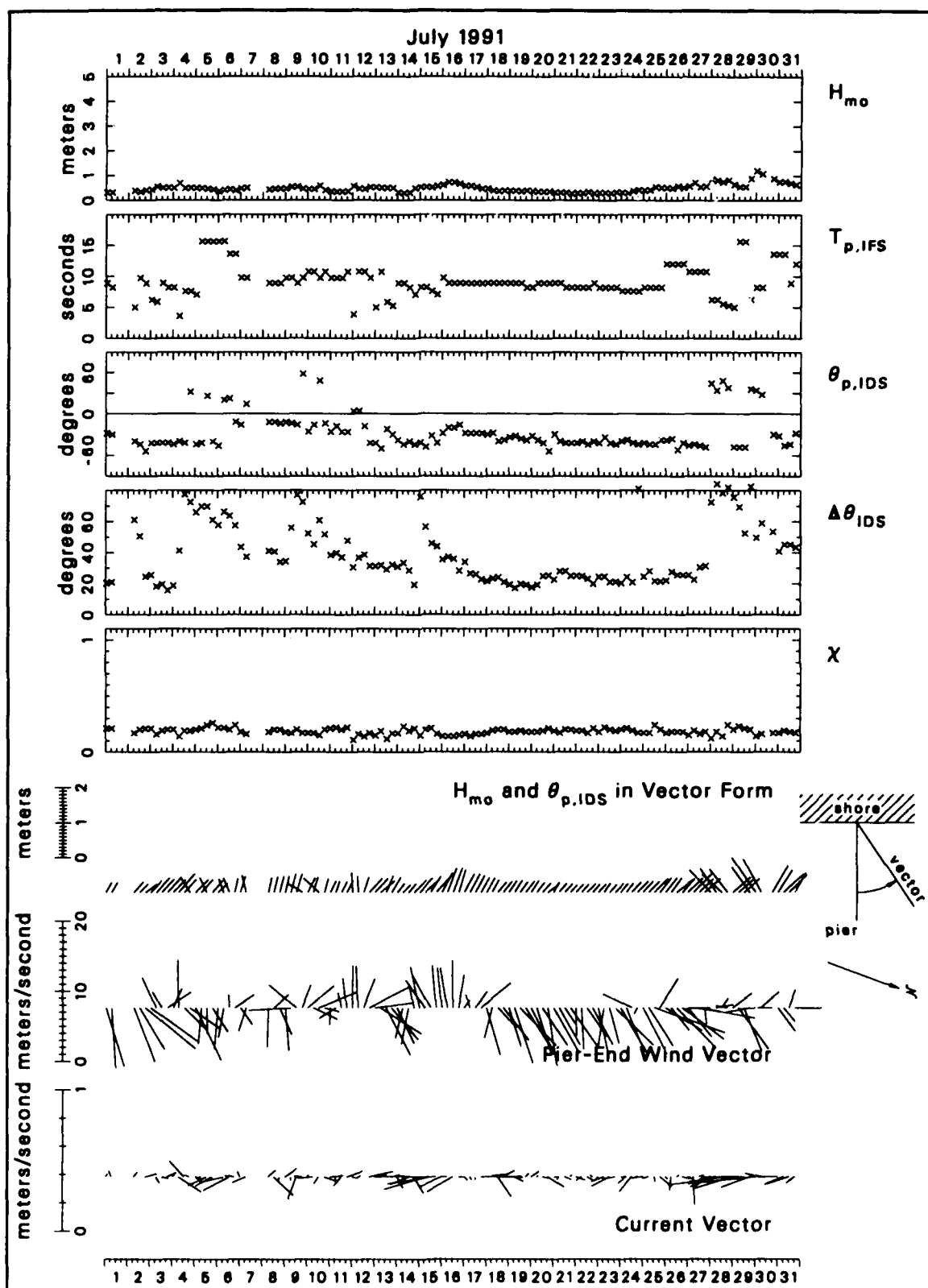


Figure B11. Bulk data for July 1991

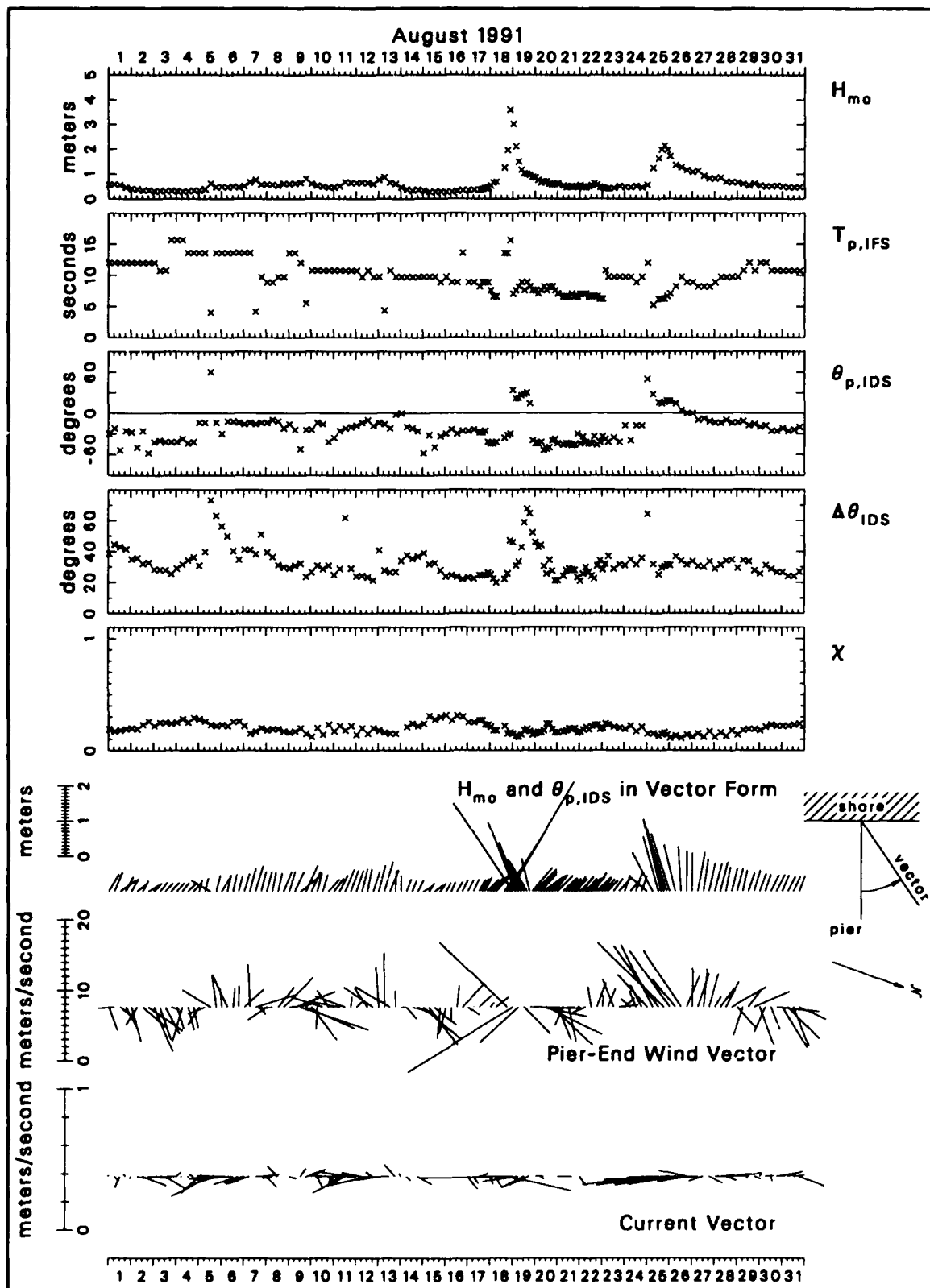


Figure B12. Bulk data for August 1991



# Appendix C

## Listing of FORTRAN Computer Program

---

```

      program readascii
c
c   This program has the codes to read FRF 8-m
c   array directional spectral ASCII output files.
c   This program simply reads the ASCII file and
c   writes an ASCII file as a test of the code.
c   You will have to tune the I/O statements to
c   your own system...
c
c   Variable names, units and meanings are:
c
c=====
c
c   datetime...[character*10] Date and Eastern Standard Time of
c   beginning of data collection in the order year,
c   month, day, hour, minute and in the form
c   yymmddhhmm (2-digit year, no blanks in any field)
c   Hmo...[m] Energy-based characteristic wave height =
c   4*sigma, where sigma^2 is the variance of sea
c   surface displacement = volume under frequency-
c   direction (f-d) spectrum
c   fp...[Hz] Frequency at the peak of the frequency spectrum
c   thp...[deg] Direction at the peak of the directional
c   distribution at f=fp
c
c   ifimle...Algorithm flag: [1]=IMLE estimate, [0]=MLE estimate
c
c   istot...[sec] Length of time series processed
c   sfrq...[Hz] Data sampling frequency in time series
c
c   ifwindo...Windowing flag: [0]=data segments not windowed,
c   [1]=data segments windowed (Kaiser-Bessel window)
c   ifdtrnd...Detrending flag: [0]=data segments not detrended,
c   [1]=data segments detrended (linear trend removed)
c   nfft...Number of data points in a data segment
c   nensb...Number of half-lapped segments analyzed
c   nband...Number of frequency bands averaged for frequency
c   smoothing
c   idgfr...Degrees of freedom of final frequency spectral
c   estimates
c
c   nofrq...Number of output frequency bands
c   delfs...[Hz] Width of an output frequency band
c   noang...Number of output direction bins (arcs)
c   odelang...[deg] Width of an output direction bin
c

```

Figure C1. Listing of FORTRAN Computer Program (Sheet 1 of 3)

```

c      dmin...[m] Minimum water depth during time series at
c      8-m array reference gage 'rname'
c      dbar...[m] Mean water depth during time series at
c      reference gage
c      dmax...[m] Maximum water depth during time series at
c      reference gage
c      rname...Reference gage ID (FRF gage name - get help if
c      you need to know which 8-m array gage it was)
c
c      s9b...[m/sec] Mean wind speed at pier end anemometer
c      (19.5 m above mean sea level) during time series
c      s9s...[m/sec] Standard deviation of wind speed at pier
c      end anemometer
c      s9m...[m/sec] Maximum wind speed at pier end anemometer
c      d9b...[deg] Vector averaged mean wind direction at pier
c      end anemometer - direction from which wind blows
c      in wave direction coordinates (degrees counter-
c      clockwise from shore normal)
c      d9s...[deg] Measure of variability of wind direction at pier
c      end anemometer = arctangent[(standard deviation of
c      cross-mean-streamline wind speed)/(mean wind speed)]
c
c      s6b... These are the same as s9b, s9s, s9m, d9b,
c      s6s... and d9s, except they are from the building
c      s6m... anemometer at the landward end of the
c      d6b... pier and 19.5 m above mean sea level
c      d6s...
c
c      oangle...[deg] Array of wave direction coordinates that
c      aligns with the f-d spectral array
c
c      nof...(Within a loop) Frequency index
c      of(nof)...[Hz] Frequency
c      osf(nof)...[m^2/Hz] Frequency spectral density at frequency
c      of(nof)
c      ogpat(nof)...[character*16] Encoded list of gages used to compute
c      directional distribution of energy at this frequency
c      itero(nof)...Number of IMLE iterations used to compute directional
c      distribution of energy at this frequency
c      ospc(nof,noa)...[1/deg] Normalized frequency-direction spectral den-
c      sity at frequency of(nof) and direction oangle(noa).
c      Dimensional frequency-direction spectrum spc(nof,noa)
c      [in m^2/(Hz deg)] is found from:
c
c      spc(nof,noa) = osf(nof)*ospc(nof,noa)
c
c=====
c
c links: none
c
c      character*4      rname
c      character*10     datetime
c      character*16     ogpat(29)
c      character*16     infile,      outfile
c      dimension        of(29),      osf(29),      itero(29)
c      dimension        oangle(181), ospc(29,181)
c
c ask user for input and output file names
c
c      write*,'(2x,'Enter input file name...: '))
c      read*,'(a)' infile
c      write*,'(2x,'Enter output file name...: '))
c      read*,'(a)' outfile
c
c open input file and read data
c
c      open(10,file=infile,status='unknown',access='sequential',
c      & form='formatted')
c
c      read(10,'(a10,f10.2,f10.5,f10.1,2i10,f10.2,i10)')
c      & datetime, Hmo, fp, thp,
c      & ifimle, istot, sfrq, ifwindo

```

Figure C1. (Sheet 2 of 3)

```

c      read(10,'(6i10,f10.5,i10)')
c      &      ifdtrnd,      nfft,      nensb,      nband,
c      &      idgfr,      nofrq,      delfs,      noang
c      read(10,'(4f10.2,6x,a4,3f10.2)')
c      &      odelang,      dmin,      dbar,      dmax,
c      &      rname,      s9b,      s9s,      s9m
c      read(10,'(2f10.1,3f10.2,2f10.1)')
c      &      d9b,      d9s,      s6b,      s6s,
c      &      s6m,      d6b,      d6s
c      read(10,'(10f8.1)') (oangle(noa),noa=1,noang)
c      do 700 nof=1,nofrq
c      read(10,'(i10,f10.5,e20.7,4x,a16,i10)')
c      &      nof,      of(nof),      osf(nof),      ogpat(nof),
c      &      itero(nof)
c      read(10,'(8f10.7)') (ospc(nof,noa),noa=1,noang)
c      700 continue
c      close(10)
c      open output file and write variables just read
c      open(11,file=outfile,status='unknown',access='sequential',
c      &      form='formatted')
c      write(11,'(a10,f10.2,f10.5,f10.1,2i10,f10.2,i10)')
c      &      datetime,      hmo,      fp,      thp,
c      &      ifimle,      istot,      sfrq,      ifwindo
c      write(11,'(6i10,f10.5,i10)')
c      &      ifdtrnd,      nfft,      nensb,      nband,
c      &      idgfr,      nofrq,      delfs,      noang
c      write(11,'(4f10.2,6x,a4,3f10.2)')
c      &      odelang,      dmin,      dbar,      dmax,
c      &      rname,      s9b,      s9s,      s9m
c      write(11,'(2f10.1,3f10.2,2f10.1)')
c      &      d9b,      d9s,      s6b,      s6s,
c      &      s6m,      d6b,      d6s
c      write(11,'(10f8.1)') (oangle(noa),noa=1,noang)
c      do 800 nof=1,nofrq
c      write(11,'(i10,f10.5,e20.7,4x,a16,i10)')
c      &      nof,      of(nof),      osf(nof),      ogpat(nof),
c      &      itero(nof)
c      write(11,'(8f10.7)') (ospc(nof,noa),noa=1,noang)
c      800 continue
c      close(11)
c      end

```

Figure C1. (Sheet 3 of 3)

# Appendix D

## Listing of Sample Data File

9010311900	0.60	0.09326	-14.0	.1	8192	4.00	1
0	4096	15	10	160	29	0.00977	91
2.00	7.62	7.90	8.18	191	1.84	0.56	3.28
14.4	18.7	2.00	0.74	3.73	23.6	13.0	
-90.0	-88.0	-86.0	-84.0	-82.0	-80.0	-78.0	-76.0
-70.0	-68.0	-66.0	-64.0	-62.0	-60.0	-58.0	-56.0
-50.0	-48.0	-46.0	-44.0	-42.0	-40.0	-38.0	-36.0
-30.0	-28.0	-26.0	-24.0	-22.0	-20.0	-18.0	-16.0
-10.0	-8.0	-6.0	-4.0	-2.0	0.0	2.0	4.0
10.0	12.0	14.0	16.0	18.0	20.0	22.0	24.0
30.0	32.0	34.0	36.0	38.0	40.0	42.0	44.0
50.0	52.0	54.0	56.0	58.0	60.0	62.0	64.0
70.0	72.0	74.0	76.0	78.0	80.0	82.0	84.0
90.0							86.0
1	0.04443	0.6951348E-02	9871456	15			
0.0062037	0.0061202	0.0059417	0.0056860	0.0053430	0.0049216	0.0044453	0.0039477
0.0035042	0.0032020	0.0031326	0.0033993	0.0041086	0.0053250	0.0069908	0.0088345
0.0104570	0.0114955	0.0117527	0.0112686	0.0102667	0.0090243	0.0078090	0.0068450
0.0062563	0.0060787	0.0062816	0.0068011	0.0075102	0.0082559	0.0088883	0.0092539
0.0092890	0.0090054	0.0084784	0.0078574	0.0072960	0.0069152	0.0067810	0.0068845
0.0071532	0.0074663	0.0076943	0.0077348	0.0075385	0.0071195	0.0065454	0.0059170
0.0053399	0.0048979	0.0046357	0.0045542	0.0046098	0.0047384	0.0048554	0.0048867
0.0047877	0.0045495	0.0041868	0.0037473	0.0032878	0.0028648	0.0025260	0.0023086
0.0022311	0.0023049	0.0025393	0.0029268	0.0034511	0.0040673	0.0046944	0.0052298
0.0055578	0.0055789	0.0052490	0.0046140	0.0038150	0.0030513	0.0024801	0.0021663
0.0021090	0.0022633	0.0025710	0.0029673	0.0033842	0.0037741	0.0040980	0.0043475
0.0045144	0.0046013	0.0046182					
2	0.05420	0.1253259E-01	9871456	30			
0.0036672	0.0036220	0.0035009	0.0033092	0.0030529	0.0027442	0.0024030	0.0020583
0.0017464	0.0015055	0.0013711	0.0013793	0.0015739	0.0020084	0.0027149	0.0036415
0.0046158	0.0054002	0.0058131	0.0058026	0.0054410	0.0048659	0.0042199	0.0036245
0.0031625	0.0028911	0.0028535	0.0031060	0.0037339	0.0048561	0.0065842	0.0089364
0.0117590	0.0147020	0.0173373	0.0193997	0.0210047	0.0227172	0.0251820	0.0282180
0.0300221	0.0284025	0.0233525	0.0170273	0.0114910	0.0075477	0.0050832	0.0036897
0.0030037	0.0027937	0.0029387	0.0033746	0.0040271	0.0047575	0.0053427	0.0055434
0.0052311	0.0044780	0.0035193	0.0026114	0.0019088	0.0014443	0.0011820	0.0010724
0.0010779	0.0011761	0.0013523	0.0015915	0.0018709	0.0021547	0.0023944	0.0025338
0.0025235	0.0023416	0.0020138	0.0016152	0.0012390	0.0009547	0.0007873	0.0007307
0.0007711	0.0008971	0.0010970	0.0013528	0.0016388	0.0019264	0.0021895	0.0024080
0.0025690	0.0026648	0.0026938					
3	0.06396	0.8163030E-01	98712456	30			
0.0015652	0.0014734	0.0013127	0.0011174	0.0009053	0.0006981	0.0005153	0.0003693
0.0002663	0.0002055	0.0001831	0.0002012	0.0002740	0.0004370	0.0007375	0.0012054
0.0018127	0.0024422	0.0029472	0.0032213	0.0032250	0.0030525	0.0028122	0.0026596
0.0027334	0.0032516	0.0044458	0.006841	0.0105605	0.0151665	0.0190019	0.0206424
0.0197927	0.0183946	0.0184431	0.0214965	0.0275999	0.0345949	0.0368491	0.0321117
0.0237172	0.0165154	0.0122879	0.0106692	0.0107074	0.0114388	0.0118601	0.0112121
0.0094486	0.0072047	0.0052356	0.0039033	0.0032178	0.0030078	0.0030715	0.0031968

Figure D1. Listing of sample data file (Sheet 1 of 6)

0.0031749	0.0028967	0.0023838	0.0017814	0.0012334	0.0008187	0.0005501	0.0003969
0.0003258	0.0003150	0.0003567	0.0004553	0.0006197	0.0008467	0.0011054	0.0013267
0.0014160	0.0013096	0.0010343	0.0007004	0.0004237	0.0002499	0.0001626	0.0001295
0.0001297	0.0001547	0.0002018	0.0002689	0.0003509	0.0004387	0.0005218	0.0005906
0.0006360	0.0006533	0.0006473					
4	0.07373	0.1382403E+00	98712456			30	
0.0008306	0.0008034	0.0007443	0.0006624	0.0005649	0.0004608	0.0003597	0.0002699
0.0001973	0.0001443	0.0001102	0.0000930	0.0000919	0.0001098	0.0001565	0.0002518
0.0004255	0.0007087	0.0011136	0.0016098	0.0021155	0.0025188	0.0027282	0.0027254
0.0025830	0.0024326	0.0024018	0.0025924	0.0030679	0.0038496	0.0048862	0.0060278
0.0070753	0.0078878	0.0084929	0.0091871	0.0105439	0.0134427	0.0187997	0.0264129
0.0331398	0.0344031	0.0296138	0.0229044	0.0179714	0.0156994	0.0154486	0.0162049
0.0168837	0.0165960	0.0150693	0.0128041	0.0106814	0.0093022	0.0087856	0.0088878
0.0091481	0.0090682	0.0083201	0.0069679	0.0053972	0.0040311	0.0030734	0.0024980
0.0021798	0.0019946	0.0018479	0.0016826	0.0014771	0.0012348	0.0009755	0.0007260
0.0005095	0.0003405	0.0002218	0.0001467	0.0001041	0.0000839	0.0000796	0.0000884
0.0001108	0.0001484	0.0002025	0.0002723	0.0003538	0.0004400	0.0005227	0.0005936
0.0006457	0.0006739	0.0006787					
5	0.08350	0.4497974E+00	7123456			14	
0.0003282	0.0003042	0.0002740	0.0002454	0.0002180	0.0001918	0.0001668	0.0001438
0.0001232	0.0001055	0.0000914	0.0000816	0.0000774	0.0000797	0.0000903	0.0001127
0.0001527	0.0002153	0.0003117	0.0004492	0.0006312	0.0008614	0.0011359	0.0014406
0.0017602	0.0020790	0.0023851	0.0026635	0.0029867	0.0034109	0.0040479	0.0050854
0.0066587	0.0088092	0.0115889	0.0146288	0.0175825	0.0199396	0.0216951	0.0228912
0.0238400	0.0247505	0.0251652	0.0247062	0.0232856	0.0211508	0.0188110	0.0167798
0.0154106	0.0147381	0.0145488	0.0146225	0.0144866	0.0139043	0.0127450	0.0112437
0.0095248	0.0079619	0.0067786	0.0058441	0.0050745	0.0043169	0.0035328	0.0027656
0.0020690	0.0014665	0.0010004	0.0006606	0.0004216	0.0002669	0.0001722	0.0001169
0.0000862	0.0000710	0.0000653	0.0000655	0.0000700	0.0000772	0.0000860	0.0000953
0.0001044	0.0001123	0.0001190	0.0001241	0.0001276	0.0001295	0.0001299	0.0001289
0.0001269	0.0001240	0.0001214					
6	0.09326	0.5915894E+00	7123456			10	
0.0001353	0.0001313	0.0001260	0.0001207	0.0001153	0.0001097	0.0001037	0.0000975
0.0000911	0.0000845	0.0000780	0.0000720	0.0000670	0.0000636	0.0000626	0.0000652
0.0000730	0.0000885	0.0001157	0.0001602	0.0002294	0.0003331	0.0004820	0.0006872
0.0009603	0.0013098	0.0017459	0.0022739	0.0029074	0.0036772	0.0046598	0.0059798
0.0078839	0.0106409	0.0144062	0.0188667	0.0230791	0.0256912	0.0259658	0.0243852
0.0219921	0.0197468	0.0180003	0.0167767	0.0159844	0.0155348	0.0153942	0.0155676
0.0160594	0.0168012	0.0175616	0.0179758	0.0176355	0.0164251	0.0144610	0.0122114
0.0100723	0.0082967	0.0069360	0.0058459	0.0049226	0.0040702	0.0032591	0.0025219
0.0018781	0.0013503	0.0009423	0.0006417	0.0004297	0.0002884	0.0001987	0.0001440
0.0001122	0.0000954	0.0000883	0.0000870	0.0000895	0.0000941	0.0000995	0.0001051
0.0001101	0.0001143	0.0001176	0.0001199	0.0001212	0.0001217	0.0001214	0.0001204
0.0001188	0.0001166	0.0001147					
7	0.10303	0.4206141E+00	7123456			30	
0.0002057	0.0001946	0.0001790	0.0001626	0.0001456	0.0001284	0.0001112	0.0000946
0.0000790	0.0000648	0.0000523	0.0000419	0.0000335	0.0000273	0.0000231	0.0000211
0.0000214	0.0000249	0.0000339	0.0000539	0.0000971	0.0001890	0.0003767	0.0007289
0.0013122	0.0021245	0.0030363	0.0037926	0.0041915	0.0042030	0.0040445	0.0040059
0.0043836	0.0055044	0.0077575	0.0112853	0.0155315	0.0188081	0.0198615	0.0189713
0.0176121	0.0171419	0.0181173	0.0203273	0.0227614	0.0238730	0.0227722	0.0201012
0.0173531	0.0156652	0.0154298	0.0165886	0.0185606	0.0201476	0.0198458	0.0170988
0.0131460	0.0097712	0.0075743	0.0063559	0.0056822	0.0051389	0.0044841	0.0036435
0.0026966	0.0018036	0.0010976	0.0006197	0.0003344	0.0001810	0.0001037	0.0000659
0.0000482	0.0000408	0.0000395	0.0000425	0.0000488	0.0000583	0.0000705	0.0000850
0.0001012	0.0001180	0.0001347	0.0001503	0.0001638	0.0001745	0.0001818	0.0001852
0.0001846	0.0001801	0.0001743					
8	0.11279	0.2262611E+00	7123456			20	
0.0002250	0.0002190	0.0002100	0.0001999	0.0001886	0.0001762	0.0001629	0.0001488
0.0001344	0.0001199	0.0001060	0.0000931	0.0000820	0.0000732	0.0000674	0.0000654
0.0000686	0.0000791	0.0001014	0.0001437	0.0002204	0.0003547	0.0005791	0.0009280
0.0014218	0.0020426	0.0027208	0.0033502	0.0038469	0.0041997	0.0045013	0.0049321
0.0057541	0.0073093	0.0100050	0.0139640	0.0184026	0.0214815	0.0218550	0.0200106
0.0175189	0.0155404	0.0144814	0.0143477	0.0150274	0.0163862	0.0182682	0.0204614
0.0226398	0.0242960	0.0247570	0.0235045	0.0206056	0.0168185	0.0131595	0.0102839
0.0083800	0.0073263	0.0068649	0.0066997	0.0065246	0.0060784	0.0052481	0.0041345
0.0029728	0.0019751	0.0012414	0.0007605	0.0004686	0.0002998	0.0002046	0.0001513
0.0001218	0.0001061	0.0000987	0.0000962	0.0000969	0.0000996	0.0001033	0.0001074
0.0001117	0.0001156	0.0001192	0.0001221	0.0001244	0.0001260	0.0001268	0.0001269
0.0001262	0.0001247	0.0001230					
9	0.12256	0.1162982E+00	7123456			15	
0.0002842	0.0002811	0.0002762	0.0002700	0.0002626	0.0002539	0.0002438	0.0002324

Figure D1. (Sheet 2 of 6)

0.0002199	0.0002064	0.0001926	0.0001791	0.0001668	0.0001570	0.0001513	0.0001519
0.0001619	0.0001865	0.0002349	0.0003232	0.0004798	0.0007518	0.0012092	0.0019383
0.0030041	0.0043677	0.0057987	0.0069001	0.0073537	0.0071808	0.0067181	0.0063639
0.0064112	0.0070559	0.0084684	0.0107652	0.0138489	0.0172089	0.0200297	0.0217378
0.0224567	0.0228006	0.0232916	0.0239627	0.0243143	0.0237202	0.0220793	0.0199750
0.0181479	0.0170041	0.0165112	0.0162513	0.0155255	0.0137685	0.0111196	0.0083612
0.0061645	0.0047000	0.0038227	0.0033278	0.0030471	0.0028498	0.0026357	0.0023428
0.0019606	0.0015307	0.0011181	0.0007742	0.0005196	0.0003475	0.0002391	0.0001741
0.0001371	0.0001180	0.0001104	0.0001106	0.0001164	0.0001261	0.0001385	0.0001523
0.0001667	0.0001808	0.0001939	0.0002057	0.0002158	0.0002242	0.0002306	0.0002352
0.0002380	0.0002389	0.0002384					
10	0.13232	0.9140659E-01	7123456			5	
0.0002903	0.0002916	0.0002943	0.0002983	0.0003035	0.0003100	0.0003178	0.0003270
0.0003376	0.0003498	0.0003639	0.0003805	0.0004006	0.0004259	0.0004592	0.0005048
0.0005689	0.0006602	0.0007897	0.0009706	0.0012169	0.0015415	0.0019512	0.0024419
0.0029938	0.0035735	0.0041447	0.0046882	0.0052155	0.0057717	0.0064261	0.0072585
0.0083419	0.0097152	0.0113458	0.0131033	0.0147795	0.0161563	0.0170702	0.0174409
0.0172854	0.0167371	0.0160359	0.0154611	0.0152498	0.0155461	0.0163669	0.0175393
0.0186474	0.0191255	0.0186730	0.0174893	0.0160820	0.0148504	0.0139017	0.0130831
0.0121106	0.0107779	0.0091377	0.0074496	0.0059580	0.0047646	0.0038544	0.0031642
0.0026278	0.0021929	0.0018251	0.0015066	0.0012313	0.0009988	0.0008093	0.0006602
0.0005465	0.0004615	0.0003987	0.0003524	0.0003179	0.0002919	0.0002720	0.0002565
0.0002441	0.0002342	0.0002261	0.0002196	0.0002143	0.0002101	0.0002069	0.0002045
0.0002029	0.0002022	0.0002021					
11	0.14209	0.5758258E-01	123456			30	
0.0003114	0.0003080	0.0003024	0.0002957	0.0002877	0.0002787	0.0002687	0.0002579
0.0002466	0.0002351	0.0002240	0.0002139	0.0002058	0.0002008	0.0002006	0.0002078
0.0002264	0.0002628	0.0003280	0.0004401	0.0006271	0.0009263	0.0013749	0.0019869
0.0027261	0.0034967	0.0041740	0.0046607	0.0049342	0.0050557	0.0051523	0.0053956
0.0060005	0.0072432	0.0094402	0.0127409	0.0166640	0.0198357	0.0207670	0.0191583
0.0160719	0.0128957	0.0105085	0.0092390	0.0092002	0.0105899	0.0138049	0.0191948
0.0262133	0.0324250	0.0343088	0.0305605	0.0237381	0.0174146	0.0132030	0.0108867
0.0096696	0.0088241	0.0078729	0.0066413	0.0052154	0.0038032	0.0025909	0.0016680
0.0010309	0.0006238	0.0003781	0.0002355	0.0001546	0.0001094	0.0000847	0.0000721
0.0000672	0.0000676	0.0000723	0.0000806	0.0000921	0.0001065	0.0001233	0.0001419
0.0001618	0.0001820	0.0002020	0.0002210	0.0002383	0.0002533	0.0002657	0.0002749
0.0002809	0.0002834	0.0002830					
12	0.15186	0.2430961E-01	123456			30	
0.0005687	0.0005694	0.0005719	0.0005762	0.0005826	0.0005912	0.0006023	0.0006164
0.0006342	0.0006568	0.0006857	0.0007234	0.0007736	0.0008418	0.0009364	0.0010698
0.0012592	0.0015263	0.0018936	0.0023750	0.0029609	0.0036074	0.0042419	0.0047894
0.0052048	0.0054885	0.0056816	0.0058499	0.0060711	0.0064288	0.0070117	0.0079059
0.0091655	0.0107492	0.0124474	0.0138844	0.0146740	0.0146435	0.0139258	0.0128518
0.0117766	0.0109753	0.0106289	0.0108523	0.0117128	0.0132066	0.0151922	0.0173334
0.0191444	0.0201742	0.0202298	0.0194705	0.0182996	0.0171267	0.0161350	0.0151841
0.0139378	0.0121673	0.0099623	0.0076496	0.0055573	0.0038673	0.0026112	0.0017321
0.0011431	0.0007605	0.0005174	0.0003654	0.0002717	0.0002152	0.0001827	0.0001662
0.0001612	0.0001647	0.0001752	0.0001912	0.0002118	0.0002359	0.0002625	0.0002903
0.0003184	0.0003458	0.0003717	0.0003955	0.0004167	0.0004350	0.0004502	0.0004621
0.0004709	0.0004764	0.0004784					
13	0.16162	0.1904783E-01	123456			30	
0.0005699	0.0005718	0.0005778	0.0005881	0.0006028	0.0006225	0.0006477	0.0006791
0.0007179	0.0007653	0.0008232	0.0008939	0.0009804	0.0010867	0.0012176	0.0013793
0.0015780	0.0018193	0.0021052	0.0024317	0.0027866	0.0031515	0.0035075	0.0038435
0.0041617	0.0044792	0.0048269	0.0052470	0.0057935	0.0065335	0.0075474	0.0089193
0.0107033	0.0128517	0.0151254	0.0170752	0.0182059	0.0182636	0.0173886	0.0159921
0.0145108	0.0132501	0.0123575	0.0118611	0.0117125	0.0118178	0.0120616	0.0123357
0.0125682	0.0127434	0.0129034	0.0131332	0.0135300	0.0141519	0.0149307	0.0155740
0.0155850	0.0145403	0.0124600	0.0098314	0.0072509	0.0051005	0.0034918	0.0023690
0.0016186	0.0011296	0.0008154	0.0006152	0.0004887	0.0004100	0.0003629	0.0003371
0.0003260	0.0003251	0.0003311	0.0003414	0.0003543	0.0003681	0.0003818	0.0003944
0.0004055	0.0004148	0.0004224	0.0004283	0.0004328	0.0004360	0.0004383	0.0004398
0.0004408	0.0004413	0.0004415					
14	0.17139	0.1209534E-01	123456			30	
0.0012198	0.0012205	0.0012244	0.0012319	0.0012435	0.0012594	0.0012802	0.0013066
0.0013392	0.0013790	0.0014266	0.0014829	0.0015485	0.0016240	0.0017100	0.0018071
0.0019167	0.0020412	0.0021853	0.0023569	0.0025679	0.0028351	0.0031807	0.0036315
0.0042167	0.0049613	0.0058724	0.0069192	0.0080115	0.0089981	0.0097078	0.0100282
0.0099781	0.0097128	0.0094667	0.0094896	0.0100274	0.0113416	0.0136978	0.0171750
0.0211551	0.0239002	0.0234910	0.0198937	0.0150796	0.0109266	0.0080876	0.0064295
0.0056561	0.0055713	0.0061222	0.0073684	0.0093878	0.0120537	0.0147155	0.0162029
0.0156322	0.0133016	0.0103653	0.0077852	0.0059011	0.0046534	0.0038692	0.0033911

Figure D1. (Sheet 3 of 6)

0.0031031	0.0029213	0.0027831	0.0026428	0.0024731	0.0022670	0.0020353	0.0017980
0.0015750	0.0013798	0.0012180	0.0010894	0.0009904	0.0009161	0.0008618	0.0008231
0.0007965	0.0007790	0.0007682	0.0007623	0.0007598	0.0007594	0.0007602	0.0007615
0.0007628	0.0007637	0.0007641					
15	0.18115	0.1116518E-01	123456			17	
0.0012800	0.0012788	0.0012774	0.0012763	0.0012757	0.0012760	0.0012775	0.0012811
0.0012876	0.0012983	0.0013150	0.0013397	0.0013751	0.0014244	0.0014909	0.0015785
0.0016907	0.0018310	0.0020023	0.0022077	0.0024502	0.0027340	0.0030651	0.0034513
0.0039015	0.0044231	0.0050181	0.0056789	0.0063847	0.0071044	0.0078053	0.0084668
0.0090924	0.0097134	0.0103842	0.0111703	0.0121306	0.0132924	0.0146146	0.0159524
0.0170594	0.0176735	0.0176615	0.0171079	0.0162597	0.0153877	0.0146805	0.0142102
0.0139428	0.0137657	0.0135293	0.0131062	0.0124462	0.0115918	0.0106444	0.0097108
0.0088648	0.0081352	0.0075110	0.0069531	0.0064098	0.0058339	0.0052016	0.0045224
0.0038341	0.0031839	0.0026099	0.0021313	0.0017498	0.0014557	0.0012349	0.0010727
0.0009563	0.0008752	0.0008212	0.0007877	0.0007696	0.0007629	0.0007642	0.0007708
0.0007804	0.0007915	0.0008028	0.0008135	0.0008231	0.0008313	0.0008380	0.0008432
0.0008469	0.0008494	0.0008504					
16	0.19092	0.8691771E-02	12345			30	
0.0014683	0.0014690	0.0014693	0.0014689	0.0014674	0.0014648	0.0014607	0.0014552
0.0014483	0.0014403	0.0014320	0.0014246	0.0014199	0.0014206	0.0014300	0.0014526
0.0014936	0.0015595	0.0016576	0.0017964	0.0019848	0.0022315	0.0025439	0.0029260
0.0033768	0.0038890	0.0044498	0.0050426	0.0056519	0.0062672	0.0068871	0.0075209
0.0081874	0.0089121	0.0097228	0.0106428	0.0116841	0.0128367	0.0140577	0.0152617
0.0163198	0.0170778	0.0173976	0.0172083	0.0165381	0.0155023	0.0142558	0.0129442
0.0116752	0.0105160	0.0095013	0.0086460	0.0079544	0.0074279	0.0070696	0.0068878
0.0068985	0.0071246	0.0075913	0.0083082	0.0092325	0.0102169	0.0109813	0.0111863
0.0106201	0.0093566	0.0077120	0.0060454	0.0045959	0.0034516	0.0025997	0.0019857
0.0015492	0.0012396	0.0010188	0.0008600	0.0007444	0.0006594	0.0005962	0.0005488
0.0005129	0.0004857	0.0004649	0.0004491	0.0004372	0.0004282	0.0004217	0.0004171
0.0004141	0.0004126	0.0004124					
17	0.20068	0.8170136E-02	12345			30	
0.0010717	0.0010737	0.0010767	0.0010802	0.0010842	0.0010886	0.0010936	0.0010995
0.0011069	0.0011163	0.0011292	0.0011470	0.0011724	0.0012083	0.0012593	0.0013307
0.0014298	0.0015650	0.0017465	0.0019850	0.0022901	0.0026673	0.0031127	0.0036092
0.0041237	0.0046120	0.0050305	0.0053521	0.0055783	0.0057403	0.0058912	0.0060938
0.0064115	0.0069043	0.0076288	0.0086356	0.0099599	0.0116004	0.0134342	0.0154308
0.0171476	0.0183018	0.0186722	0.0182851	0.0174057	0.0163780	0.0154550	0.0147349
0.0141931	0.0137436	0.0132906	0.0127604	0.0121183	0.0113730	0.0105705	0.0097797
0.0090729	0.0085084	0.0081164	0.0078906	0.0077839	0.0077102	0.0075606	0.0072361
0.0066875	0.0059378	0.0050698	0.0041870	0.0033756	0.0026849	0.0021291	0.0016987
0.0013735	0.0011311	0.0009514	0.0008180	0.0007187	0.0006444	0.0005883	0.0005458
0.0005134	0.0004887	0.0004697	0.0004553	0.0004443	0.0004362	0.0004303	0.0004263
0.0004239	0.0004230	0.0004232					
18	0.21045	0.5116608E-02	12345			30	
0.0024935	0.0025033	0.0025194	0.0025386	0.0025599	0.0025823	0.0026041	0.0026238
0.0026397	0.0026508	0.0026570	0.0026601	0.0026640	0.0026757	0.0027056	0.0027671
0.0028766	0.0030525	0.0033136	0.0036766	0.0041519	0.0047362	0.0054049	0.0061055
0.0067594	0.0072774	0.0075873	0.0076633	0.0075399	0.0073007	0.0070499	0.0068854
0.0068842	0.0071026	0.0075811	0.0083444	0.0093907	0.0106634	0.0120161	0.0131967
0.0139032	0.0139310	0.0133270	0.0123965	0.0115337	0.0110352	0.0110318	0.0115104
0.0123416	0.0132812	0.0139858	0.0140969	0.0133991	0.0119572	0.0100992	0.0082365
0.0066735	0.0055385	0.0048304	0.0044936	0.0044660	0.0046908	0.0051033	0.0056078
0.0060640	0.0063063	0.0062053	0.0057350	0.0049902	0.0041316	0.0033072	0.0026050
0.0020520	0.0016372	0.0013342	0.0011156	0.0009582	0.0008446	0.0007624	0.0007025
0.0006589	0.0006271	0.0006040	0.0005874	0.0005757	0.0005676	0.0005623	0.0005592
0.0005578	0.0005579	0.0005588					
19	0.22021	0.4332541E-02	12345			30	
0.0012212	0.0012305	0.0012560	0.0012983	0.0013595	0.0014426	0.0015516	0.0016916
0.0018688	0.0020905	0.0023639	0.0026948	0.0030842	0.0035245	0.0039936	0.0045516
0.0048435	0.0051111	0.0052143	0.0051495	0.0049540	0.0046921	0.0044327	0.0042316
0.0041257	0.0041350	0.0042671	0.0045188	0.0048741	0.0053005	0.0057486	0.0061599
0.0064845	0.0067013	0.0068296	0.0069248	0.0070648	0.0073360	0.0078278	0.0086298
0.0098235	0.0114466	0.0134146	0.0154234	0.0169555	0.0175259	0.0170326	0.0158180
0.0143744	0.0130506	0.0119826	0.0111613	0.0105126	0.0099494	0.0094017	0.0088337
0.0082483	0.0076794	0.0071740	0.0067738	0.0065030	0.0063628	0.0063309	0.0063621
0.0063915	0.0063455	0.0061604	0.0058060	0.0052976	0.0046896	0.0040524	0.0034478
0.0029152	0.0024706	0.0021129	0.0018320	0.0016147	0.0014480	0.0013207	0.0012237
0.0011500	0.0010940	0.0010517	0.0010199	0.0009962	0.0009789	0.0009665	0.0009580
0.0009528	0.0009504	0.0009502					
20	0.22998	0.4104202E-02	12345			30	
0.0020307	0.0020338	0.0020442	0.0020623	0.0020886	0.0021242	0.0021700	0.0022274
0.0022982	0.0023841	0.0024868	0.0026080	0.0027483	0.0029073	0.0030824	0.0032686

Figure D1. (Sheet 4 of 6)

0.0034579	0.0036395	0.0038016	0.0039322	0.0040226	0.0040691	0.0040747	0.0040491
0.0040077	0.0039688	0.0039514	0.0039737	0.0040520	0.0042018	0.0044391	0.0047833
0.0052592	0.0058994	0.0067447	0.0078417	0.0092315	0.0109232	0.0128498	0.0148184
0.0165046	0.0175523	0.0177573	0.0171903	0.0161359	0.0149183	0.0137687	0.0127935
0.0120044	0.0113614	0.0108072	0.0102910	0.0097809	0.0092665	0.0087537	0.0082563
0.0077879	0.0073584	0.0069722	0.0066283	0.0063212	0.0060416	0.0057775	0.0055158
0.0052451	0.0049578	0.0046518	0.0043305	0.0040013	0.0036734	0.0033561	0.0030574
0.0027829	0.0025364	0.0023192	0.0021313	0.0019712	0.0018364	0.0017243	0.0016319
0.0015562	0.0014947	0.0014450	0.0014051	0.0013734	0.0013485	0.0013294	0.0013154
0.0013058	0.0013002	0.0012984					
21	0.23975	0.3788739E-02	12345			30	
0.0038335	0.0038425	0.0038675	0.0039079	0.0039631	0.0040324	0.0041147	0.0042084
0.0043118	0.0044226	0.0045378	0.0046534	0.0047637	0.0048600	0.0049308	0.0049621
0.0049399	0.0048534	0.0046988	0.0044805	0.0042113	0.0039103	0.0036008	0.0033068
0.0030513	0.0028547	0.0027337	0.0027021	0.0027715	0.0029514	0.0032487	0.0036633
0.0041814	0.0047670	0.0053564	0.0058639	0.0062061	0.0063409	0.0063005	0.0061888
0.0061432	0.0062833	0.0066780	0.0073250	0.0081369	0.0089407	0.0095286	0.0097655
0.0096874	0.0094954	0.0094501	0.0097636	0.0105519	0.0118114	0.0133689	0.0148208
0.0155754	0.0151215	0.0134106	0.0109524	0.0084594	0.0064189	0.0049746	0.0040583
0.0035432	0.0033205	0.0033167	0.0034853	0.0037933	0.0042062	0.0046762	0.0051359
0.0055034	0.0057021	0.0056885	0.0054692	0.0050972	0.0046461	0.0041838	0.0037567
0.0033878	0.0030831	0.0028388	0.0026468	0.0024985	0.0023859	0.0023024	0.0022429
0.0022038	0.0021825	0.0021768					
22	0.24951	0.4635170E-02	12345			30	
0.0031398	0.0031485	0.0031675	0.0031955	0.0032331	0.0032808	0.0033386	0.0034061
0.0034816	0.0035616	0.0036403	0.0037096	0.0037591	0.0037785	0.0037594	0.0036988
0.0036012	0.0034778	0.0033444	0.0032181	0.0031138	0.0030433	0.0030142	0.0030306
0.0030924	0.0031951	0.0033286	0.0034767	0.0036189	0.0037351	0.0038123	0.0038486
0.0038527	0.0038391	0.0038215	0.0038095	0.0038077	0.0038209	0.0038599	0.0039477
0.0041197	0.0044195	0.0048910	0.0055707	0.0064700	0.0075364	0.0085928	0.0093151
0.0093666	0.0086824	0.0075866	0.0065318	0.0057961	0.0054441	0.0054326	0.0056851
0.0061025	0.0065472	0.0068468	0.0068466	0.0064963	0.0058887	0.0052024	0.0046034
0.0041929	0.0040175	0.0041058	0.0045024	0.0052924	0.0066154	0.0086512	0.0115246
0.0150622	0.0184815	0.0204744	0.0200758	0.0175468	0.0140797	0.0107805	0.0081559
0.0062483	0.0049148	0.0039923	0.0033517	0.0029031	0.0025870	0.0023645	0.0022108
0.0021099	0.0020521	0.0020326					
23	0.25928	0.4466792E-02	12345			30	
0.0024848	0.0025086	0.0025734	0.0026841	0.0028525	0.0030964	0.0034407	0.0039178
0.0045648	0.0054114	0.0064518	0.0075948	0.0086136	0.0091657	0.0089530	0.0079510
0.0064672	0.0049351	0.0036612	0.0027483	0.0021688	0.0018578	0.0017683	0.0018927
0.0022715	0.0029911	0.0041361	0.0056338	0.0070286	0.0075626	0.0068462	0.0053276
0.0037861	0.0026645	0.0020172	0.0017654	0.0018758	0.0024395	0.0036743	0.0056764
0.0077831	0.0086223	0.0077399	0.0061259	0.0047829	0.0040414	0.0038941	0.0043146
0.0053107	0.0067769	0.0082813	0.0091912	0.0092506	0.0088023	0.0083395	0.0081124
0.0080921	0.0080725	0.0078042	0.0071579	0.0062202	0.0052201	0.0043721	0.0037939
0.0035294	0.0036101	0.0041110	0.0051917	0.0071014	0.0100616	0.0138845	0.0174760
0.0190896	0.0177937	0.0144340	0.0106548	0.0075363	0.0053390	0.0039060	0.0030010
0.0024355	0.0020842	0.0018689	0.0017413	0.0016707	0.0016364	0.0016240	0.0016228
0.0016250	0.0016250	0.0016218					
24	0.26904	0.5092753E-02	12345			30	
0.0059556	0.0059407	0.0058815	0.0057786	0.0056394	0.0054759	0.0053048	0.0051485
0.0050338	0.0049899	0.0050433	0.0052100	0.0054825	0.0058150	0.0061164	0.0062655
0.0061567	0.0057530	0.0051079	0.0043388	0.0035735	0.0029081	0.0023926	0.0020416
0.0018535	0.0018288	0.0019833	0.0023558	0.0029992	0.0039397	0.0050845	0.0061270
0.0066124	0.0062608	0.0052599	0.0041153	0.0032428	0.0027963	0.0027758	0.0031518
0.0038734	0.0047864	0.0055847	0.0059462	0.0057889	0.0053382	0.0049211	0.0047629
0.0049588	0.0055230	0.0064056	0.0074679	0.0084701	0.0091439	0.0093340	0.0090765
0.0085347	0.0078815	0.0072385	0.0066786	0.0062473	0.0059814	0.0059205	0.0061124
0.0066122	0.0074679	0.0086811	0.0101439	0.0115865	0.0126140	0.0128682	0.0122236
0.0108544	0.0091219	0.0073887	0.0058956	0.0047400	0.0039185	0.0033794	0.0030603
0.0029051	0.0028682	0.0029134	0.0030114	0.0031381	0.0032741	0.0034040	0.0035166
0.0036039	0.0036607	0.0036825					
25	0.27881	0.4696852E-02	12345			30	
0.0091069	0.0090836	0.0090325	0.0089571	0.0088565	0.0087294	0.0085740	0.0083881
0.0081687	0.0079118	0.0076122	0.0072650	0.0068686	0.0064300	0.0059693	0.0055183
0.0051144	0.0047921	0.0045768	0.0044832	0.0045140	0.0046577	0.0048809	0.0051203
0.0052819	0.0052621	0.0049917	0.0044792	0.0038142	0.0031256	0.0025279	0.0020920
0.0018525	0.0018321	0.0020640	0.0025816	0.0033434	0.0041418	0.0046694	0.0047558
0.0044776	0.0040333	0.0035907	0.0032402	0.0030173	0.0029370	0.0030190	0.0033089
0.0038995	0.0049485	0.0066595	0.0091278	0.0119534	0.0139655	0.0139723	0.0121000
0.0096203	0.0075916	0.0063395	0.0057838	0.0057640	0.0061401	0.0067827	0.0075507
0.0082970	0.0089021	0.0093050	0.0095024	0.0095180	0.0093635	0.0090185	0.0084433

Figure D1. (Sheet 5 of 6)

0.0076218	0.0066046	0.0055099	0.0044728	0.0035882	0.0028910	0.0023703	0.0019944
0.0017288	0.0015438	0.0014166	0.0013307	0.0012737	0.0012370	0.0012142	0.0012005
0.0011926	0.0011881	0.0011862					
26	0.28857	0.4730300E-02	12345			27	
0.0040851	0.0040637	0.0040070	0.0039194	0.0038061	0.0036755	0.0035389	0.0034107
0.0033075	0.0032472	0.0032464	0.0033177	0.0034652	0.0036778	0.0039230	0.0041446
0.0042731	0.0042519	0.0040698	0.0037760	0.0034633	0.0032306	0.0031541	0.0032824
0.0036430	0.0042416	0.0050425	0.0059351	0.0067096	0.0070938	0.0068882	0.0061400
0.0051652	0.0043364	0.0038527	0.0037067	0.0037797	0.0039341	0.0040764	0.0041889
0.0043270	0.0045860	0.0050482	0.0057054	0.0063839	0.0068062	0.0068458	0.0066818
0.0066321	0.0069201	0.0075683	0.0083380	0.0087293	0.0082744	0.0070337	0.0056143
0.0046041	0.0042414	0.0045595	0.0055779	0.0073093	0.0096072	0.0119786	0.0136188
0.0138773	0.0128088	0.0111267	0.0096050	0.0086502	0.0083103	0.0084337	0.0087664
0.0090100	0.0089101	0.0083641	0.0074610	0.0064066	0.0054022	0.0045682	0.0039405
0.0035024	0.0032174	0.0030470	0.0029587	0.0029261	0.0029290	0.0029517	0.0029820
0.0030109	0.0030321	0.0030411					
27	0.29834	0.4504357E-02	12345			30	
0.0068796	0.0069093	0.0069676	0.0070371	0.0070957	0.0071093	0.0070318	0.0068120
0.0064102	0.0058224	0.0050984	0.0043346	0.0036385	0.0030891	0.0027238	0.0025517
0.0025785	0.0028276	0.0033508	0.0042165	0.0054310	0.0067397	0.0074644	0.0069355
0.0053801	0.0037356	0.0025997	0.0020074	0.0018194	0.0019507	0.0023879	0.0030879
0.0037777	0.0039729	0.0035585	0.0030037	0.0027628	0.0030500	0.0040682	0.0060264
0.0084442	0.0094001	0.0077301	0.0051936	0.0035284	0.0029001	0.0030313	0.0037340
0.0047277	0.0055027	0.0057095	0.0055195	0.0053304	0.0053806	0.0056510	0.0058859
0.0057762	0.0053075	0.0047947	0.0045640	0.0048210	0.0057509	0.0075708	0.0102701
0.0129473	0.0138736	0.0124658	0.0100841	0.0081182	0.0069890	0.0066184	0.0068629
0.0076025	0.0086668	0.0097344	0.0103518	0.0101742	0.0092339	0.0078934	0.0065450
0.0054100	0.0045425	0.0039122	0.0034653	0.0031528	0.0029366	0.0027896	0.0026930
0.0026343	0.0026054	0.0026000					
28	0.30811	0.4780553E-02	12345			29	
0.0026338	0.0026420	0.0026645	0.0027041	0.0027669	0.0028621	0.0030018	0.0032016
0.0034794	0.0038535	0.0043364	0.0049229	0.0055751	0.0062100	0.0067093	0.0069635
0.0069328	0.0066764	0.0063195	0.0059817	0.0057159	0.0054802	0.0051506	0.0045938
0.0037845	0.0028599	0.0020260	0.0014173	0.0010570	0.0009159	0.0009789	0.0012730
0.0018134	0.0024442	0.0028106	0.0027428	0.0024883	0.0024151	0.0028267	0.0040820
0.0064505	0.0089735	0.0092789	0.0071999	0.0050480	0.0040211	0.0041023	0.0051283
0.0067676	0.0081313	0.0083582	0.0077168	0.0072008	0.0075464	0.0091035	0.0118146
0.0146918	0.0159127	0.0147111	0.0123713	0.0104866	0.0096519	0.0097368	0.0103438
0.0110088	0.0113766	0.0113633	0.0111283	0.0108734	0.0106601	0.0103681	0.0097956
0.0088283	0.0075410	0.0061446	0.0048501	0.0037795	0.0029613	0.0023680	0.0019530
0.0016703	0.0014832	0.0013639	0.0012923	0.0012537	0.0012373	0.0012350	0.0012404
0.0012489	0.0012574	0.0012626					
29	0.31787	0.4188972E-02	12345			30	
0.0040406	0.0040069	0.0039166	0.0037733	0.0035808	0.0033457	0.0030788	0.0027962
0.0025189	0.0022701	0.0020728	0.0019464	0.0019070	0.0019705	0.0021561	0.0024893
0.0029951	0.0036688	0.0044091	0.0049429	0.0048991	0.0041548	0.0030654	0.0021214
0.0015363	0.0012862	0.0013190	0.0016671	0.0024743	0.0038668	0.0054715	0.0062926
0.0060682	0.0057107	0.0060105	0.0072066	0.0089394	0.0098952	0.0088383	0.0066250
0.0050006	0.0046618	0.0057199	0.0080270	0.0101004	0.0096928	0.0072908	0.0051083
0.0040204	0.0039057	0.0045162	0.0054982	0.0063609	0.0068925	0.0073273	0.0079150
0.0084706	0.0083139	0.0070864	0.0055061	0.0044606	0.0042491	0.0049901	0.0070801
0.0112136	0.0172886	0.0221767	0.0217220	0.0170360	0.0122459	0.0091114	0.0074272
0.0066509	0.0063743	0.0063001	0.0061876	0.0058726	0.0053227	0.0046369	0.0039596
0.0033921	0.0029682	0.0026769	0.0024904	0.0023798	0.0023209	0.0022947	0.0022868
0.0022865	0.0022865	0.0022842					

Figure D1. (Sheet 6 of 6)

# Appendix E

## Notation

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<u>Text</u>	<u>Appendix C</u>	
<i>asc</i>		Mnemonic indicating that an output data file is in ASCII format
	<i>datetime</i>	Ten-character string that contains date and time
<i>dd</i>		Two-digit code for day
	<i>dbar</i>	Mean water depth
	<i>dmax</i>	Maximum segment-averaged water depth in a collection
	<i>dmin</i>	Minimum segment-averaged water depth in a collection
<i>df</i>	<i>delfs</i>	Frequency increment
	<i>d6b</i>	Vector averaged mean wind direction at building anemometer
	<i>d6s</i>	Measure of variability of wind direction at building anemometer
	<i>d9b</i>	Vector averaged mean wind direction at pier-end anemometer
	<i>d9s</i>	Measure of variability of wind direction at pier-end anemometer
<i>dθ</i>	<i>odelang</i>	Direction increment

Text      Appendix C

$D(f_n, \theta_m)$		Directional distribution function at frequency $f_n$ and direction $\theta_m$
$E_i$		Incident wave energy
$E_r$		Reflected wave energy
$fd$		Mnemonic denoting frequency-direction to distinguish a type of output data file
$f_n$		$n^{\text{th}}$ frequency of a set of $N$ discrete frequencies
$f_p$		Peak frequency
	fp	Frequency at peak of frequency spectrum
$f_{p,FD}$		Frequency at peak of frequency-direction spectrum
$f_{p,IFS}$		Frequency at peak of integrated frequency spectrum
$hh$		Two-digit code for hour
$hhmm$		Four-digit code for time of day using $hh$ for hour and $mm$ for minute
$H_{mo}$	Hmo	Characteristic wave height
$H_{mo,i}$		Characteristic incident wave height
$H_{mo,r}$		Characteristic reflected wave height
	idgfr	Degrees of freedom in cross-spectral estimation
	ifdtrnd	Flag indicating whether or not data have been detrended
	ifimle	Flag indicating if maximum likelihood or iterative maximum likelihood estimation is used
	ifwindo	Flag indicating whether or not data segments have been windowed

Text      Appendix C

	istot	Total number of seconds duration of a time series
	itero(nof)	Number of iterative maximum likelihood iterations used to compute directional distribution at frequency of(nof)
$I(f_n, \theta_j)$		Cumulative distribution function at frequency $f_n$ and direction $\theta_m$
$j$		Index associated with discrete direction
$la$		Mnemonic denoting linear array to distinguish a type of output data file
$m$	noa	Index associated with discrete direction
$M$	noang	Integer number of discrete directions
$mm$		Two-digit code for month or minute as dictated by context
$n$	nof	Index associated with discrete frequency
	nband	Number of frequency bands averaged in spectral estimation
	nensb	Number of segments into which a data record is divided during spectral estimation
	nfft	Number of data points in a data segment
$N$	nofrq	Integer number of discrete frequencies
	oangle(noa)	Element noa of an array that represents direction coordinates
	of(nof)	Element nof of an array that represents frequency
	ogpat(nof)	Element nof of an array of sixteen-character strings that represent the working gauge pattern
	osf(nof)	Element nof of an array that represents the frequency spectrum

Text      Appendix C

$ospc(nof, noa)$	Array element representing the directional distribution function at frequency $of(nof)$ and direction $oangle(noa)$
$rname$	Four-character string denoting reference gauge
$sfrq$	Sampling frequency
$s6b$	Mean wind speed at building anemometer
$s6m$	Maximum wind speed at building anemometer
$s6s$	Standard deviation of wind speed at building anemometer
$s9b$	Mean wind speed at pier-end anemometer
$s9m$	Maximum wind speed at pier-end anemometer
$s9s$	Standard deviation of wind speed at pier-end anemometer
$S(f)$	Frequency spectrum
$S(f_n)$	Integrated frequency spectral density at frequency $f_n$
$S(\theta_m)$	Integrated direction spectral density at direction $\theta_m$
$S(f_n, \theta_m)$	Frequency-direction spectral density at frequency $f_n$ and direction $\theta_m$
$S_{min}(f_n)$	Minimum of $S(f_n, \theta_m)$ at frequency $f_n$
$thp$	Peak direction of directional distribution at frequency $f_p$
$T_p$	Spectral peak period
$T_{p,FD}$	Spectral peak period from the frequency at which the frequency-direction spectrum is a maximum

Text      Appendix C

$T_{p,IFS}$	Peak period from the integrated frequency spectrum
$w_m$	$m^{th}$ of a set of $M$ weights used in the computation of incident and reflected energy
$yy$	Two-digit code for year
$yymmdd$	Six-digit code for date using $yy$ for year, $mm$ for month, and $dd$ for day
$\Delta\theta$	Directional spread parameter
$\Delta\theta_n$	Directional spread parameter of a 180-deg directional distribution at frequency $f_n$
$\Delta\theta_{FDP}$	Directional spread parameter of the directional distribution at the peak frequency of a frequency-direction spectrum
$\Delta\theta_{IDS}$	Directional spread parameter of integrated direction spectrum
$\Delta\theta_{SW}$	Spectrally weighted directional spread parameter
$\theta_j$	$j^{th}$ direction of a set of $M$ discrete directions
$\theta_m$	$m^{th}$ direction of a set of $M$ discrete directions
$\theta_p$	Peak direction
$\theta_{p,n}$	Direction of peak in directional distribution function at frequency $f_n$
$\theta_{p,FD}$	Direction at peak of frequency-direction spectrum
$\theta_{p,IDS}$	Direction at peak of integrated direction spectrum
$\theta_{p,SW}$	Spectrally weighted peak direction

<u>Text</u>	<u>Appendix C</u>
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$\theta_{25\%,n}$	Direction at which cumulative distribution function equals 0.25 at frequency $f_n$
$\theta_{50\%,n}$	Direction at which cumulative distribution function equals 0.50 at frequency $f_n$
$\theta_{75\%,n}$	Direction at which cumulative distribution function equals 0.75 at frequency $f_n$
$\chi$	Reflection coefficient

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